ROADS AND STREETS

...YS BRIDGES
...IRFIELDS
...Y CONSTRUCTION

DECEMBER 1949

TIMKEN® ANNOUNCES NEW ONE-USE BIT WITH REVOLUTIONARY "SPIRALOCK" UNION

LATEST ADDITION TO THE TIMKEN® ROCK BIT LINE OFFERS UNEQUALLED ADVANTAGES FOR MANY OPERATING CONDITIONS . . .

For drilling jobs where bit reconditioning is impractical or undesirable, The Timken Roller Bearing Company announces a One-use "Spiralock" rock bit which takes its place alongside the famous Multi-use Threaded Timken rock bit that has been standard in the mining and construction industries for 17 years, and the Carbide-Insert Threaded Timken rock bit introduced more recently.

The new One-use "Spiralock" Timken rock bit offers more advantages than any other rock bit of its type. It has a revolutionary "Spiralock" union, whose superiority has been proved under actual on-the-job conditions. Designed for fast drilling at low cost, the One-use Timken rock bit with "Spiralock" union is made in a variety of types and sizes.

For help in selecting the right bit for your job—whether it's the One-use "Spiralock" Timken rock bit, the Multi-use Threaded Timken rock bit or the Carbide-Insert Threaded Timken rock bit — call upon our rock bit engineering service.

THE TIMKEN ROLLER BEARING COMPANY
CANTON 6, OHIO · Cable Address "TIMROSCO"

1. Easier To Get On And Off!
A few blows of the drill and it's on! A few blows of a hammer and it's off! Smooth socket contours assure easy detachability.

2. Stays On More Dependably!
New One-use "Spiralock" Timken rock bit has square socket that spirals slightly as it recedes, forming a "Spiralock" union that prevents bit coming off the steel in the hole.

3. Non-Choking Back Face
Back face is scalloped and rounded-off to prevent chips packing behind bit.

4. Made of Timken Electric Furnace Steel
Fast cutting. Long lasting. Uniform quality.

5. Non-Rifling
The "X" cutting edge of the "Spiralock" bit prevents rifling in any ground.

6. Crowned Chisel Pilot
Easier starting and centering.

7. Simplifies Preparation of Drill Steels
Due to "Spiralock" union, steels last much longer — are easier to prepare and recondition. Square steel ends simplify fitting. They may be machined or forged.

8. Any Steels Can Be Used!
Existing drill steels of any size and section can be easily and quickly adapted to the One-use "Spiralock" Timken rock bit.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

ROCK BITS

Your best bet for the best bit for every job.

Carbide Insert Threaded Timken Rock Bit

Multi-use Threaded Timken Rock Bit

One-use "Spiralock" Timken Rock Bit

One of four concrete bridges built for the new road. Bethlehem supplied the reinforcing steel.

Road Construction Near Lancaster, Pa.

Approximately five miles of Pennsylvania's Route 23, popular highway carrying local traffic between Lancaster and Philadelphia through Phoenixville, underwent reconstruction recently in the Lancaster area. Various phases of the two-lane, four-bridge project are shown in the accompanying pictures. Contractor: C. W. Good, Inc., Lancaster. Bridge reinforcing, bar mats and dowel units were supplied by Bethlehem.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

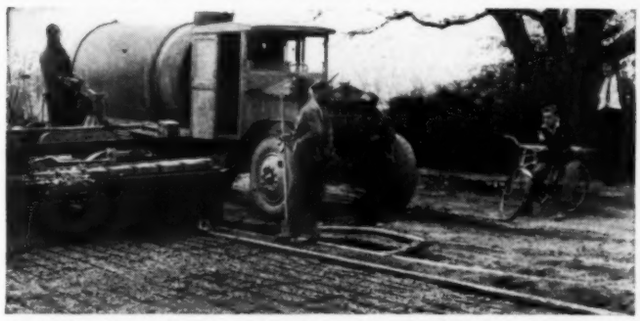
On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

STEEL FOR HIGHWAYS

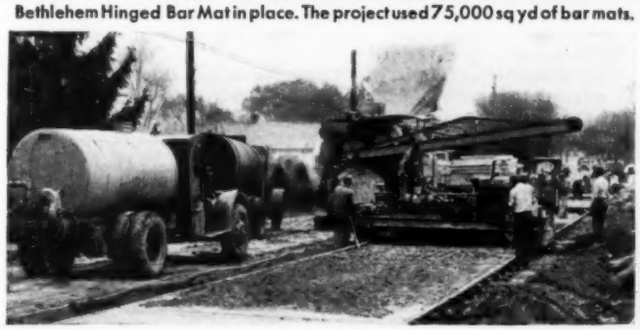
Dowel Units • Reinforcing Bars • Bar Mats • Guard Rail
Guard Rail Posts • Wire Rope and Strand
Pipe • Hollow Drill Steel • Spikes • Bolts and Nuts
Tie-Rods • Timber Bridge Hardware
Sheet- and H-Piling • Fabricated Structural Steel

BETHLEHEM STEEL

Bethlehem Dowel Unit, fitted with full-depth contraction plate, awaits batch.



Bethlehem Hinged Bar Mat in place. The project used 75,000 sq yd of bar mats.



With the screed virtually on heels of skip, paving proceeds at lively pace.

Men in charge of the project take time out to pose for photographer. From left to right: Harry Henry, inspector, Pa. Dept. of Highways; Zeplan Lee, foreman, and John Long, superintendent for C. W. Good, Inc.; E. D. Colling, project engineer, and Thomas Jones and H. J. Koutris, inspectors, Pa. Dept. of Highways.

ROADS AND STREETS

December, 1949 • Vol. 92 • No. 12

Roads and Streets represents 57 years of continuous publishing in the highway field; combined with Engineering & Contracting and Good Roads Magazines, established in 1892

E. S. GILLETTE, Publisher

ECA

HALBERT P. GILLETTE, Editor-in-Chief

Coming Articles

Bituminous Practice
A new editorial department of R and S begins with this issue. Next month: How one Michigan county has worked double-speed to bring its road system up to date, making use of the latest hot-mix equipment.

Fast Yardage Jobs in 1949
Case examples will appear in our "Knockin' Out the Yardage" department.

Rock Excavation
January issue will have an article or two of special interest on this subject.

Designing Mountain Grades
Important new data developed in Arizona, showing best combination of gradient and grade length, and when to add a truck lane on uphill side.

What Size Shovel and Hauling Units?
Data from the new Bulletin No. 3 of the Power Crane and Shovel Association.

Bridge Projects
Bridges in Louisiana; Washington, D.C.; elsewhere—design features and construction methods.

Soils Engineering
A new series on development and use of tri-axial methods of road design in Texas.

Snow and Ice Control
Look for a new series of case reports on progressive county, state and city methods.

Highway Research Board
As usual, a comprehensive summary of selected committee sessions and technical papers.

What Happens in the Contractor's Shop in Winter?
The answer, "It varies," hides a wealth of valuable experience. Watch for articles on winter over-hauling practice, and what some leading contractors do to keep their key men occupied through the "slow months."

Contractors and the superintendents . . . officials and engineers . . . something for all in each issue of "Roads and Streets". Watch for your next copy. Practical "how it was done" articles invited from readers.

In This Issue

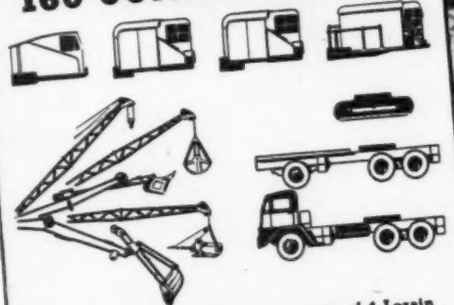
A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations, and to the construction and maintenance of airports.

Gillette Publishing Company, Publication and Editorial Offices, 22 West Maple Street, Chicago 10, Ill.

Chicago Office.....H. J. Conway, Advertising Manager, 22 W. Maple St.
R. T. Wilson E. Bender
F. H. Bowes M. B. Nylund
New York Office.....H. D. Crippen, Manager, 155 E. 44th St.
E. D. Kall F. J. Michel, Jr.
Cleveland Office.....Lee B. McMahon, Manager, Leader Building
Los Angeles Office....Don Harway, West Coast Representative, 1709 W. 8th St.

Acceptance under Act of June 5, 1934. Authorized April 16, 1948, at Mount Morris, Illinois. Published monthly. Subscription price $5.00 per year.

160 COMBINATIONS



Put any of 5 Lorain booms . . . on any of 4 Lorain turntable capacities . . . then select the Lorain mounting from crawler, Self-propelled rubber tire carrier (7 m.p.h.) or high speed Moto-Cranes (30 m.p.h.) . . . then you're in business for top profits!

***STOP** At Your **LORAIN** Distributor*

• Your name on a Lorain puts you ahead of competition three ways. First, you have selected your Lorain from 160 combinations—the right *capacity*, the right *front end,* and the right *mounting* to exactly fit your immediate jobs. Second, you're set for many more jobs ahead—because you can interchange from crawler to rubber tires, or to any of 5 booms, to meet any travel condition or material handling problem. Finally, your Lorain is backed by the best equipped, best trained, best stocked Distributor organization in the shovel-crane business. And there's more still in the modern, long-lived design that has made Lorain the leader among builders of commercial size shovel-cranes.

It *will* be good business to *always* see your Lorain Distributor for every shovel-crane need. He will show you the way to bigger profits!

THE THEW SHOVEL CO., LORAIN, OHIO

THEW · Lorain®

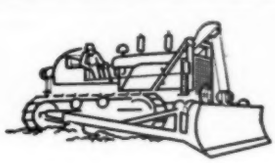
SHOVELS • CRANES
DRAGLINES
CLAMSHELLS
HOES

BONUS

Haul roads at Grapevine Dam, Texas, were built by this New TD-24, owned by J. W. Mosley, contractor. In addition it pulls tamping rollers totalling 70,000 pounds in weight! "The TD-24 has operated in extremely muddy conditions most satisfactorily," says Mr. Mosley. Its power and maneuverability gives it an edge that pays extra dividends.

Standardize on Power that Pays

CRAWLER TRACTORS • WHEEL TRACTORS • DIESEL ENGINES • POWER UNITS



Extra profits are yours whenever the New International TD-24 diesel crawler takes on your heavy earthmoving jobs. By reducing your operating costs while increasing your payload production, the TD-24 actually hands you a bonus every working day!

No other crawler can match the TD-24 in work capacity.

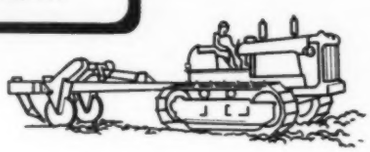
Quick starting, *on-the-go gear shifting,* instant high-low range speed changes, *eight speeds to 7.8 m.p.h. in each direction of travel,* and turns with power on both tracks are a few of the exclusive operating features which make the TD-24 your big bonus producer.

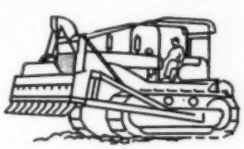
With its 140 drawbar horsepower, matchless maneuverability, and wide range of speeds at your finger tips, the New TD-24 is certainly the tractor you want. Thoroughly field-tested and job-proved, the New TD-24 is now available at your International Industrial Power Distributor's plant.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

INTERNATIONAL HARVESTER

INTERNATIONAL
INDUSTRIAL POWER





OPERATION WINTER

This winter, keep traffic moving with TRAXCAVATORS. Their smooth action and handling ease is a real time-saving combination when there's snow, slush or ice to be removed. TRAXCAVATORS plow the snow to one side, scoop it up, load it into trucks or carry it to a disposal point.

But snow removal is only *one* of the many jobs TRAXCAVATORS do. They are also kept busy on sanitary land fill, building and maintaining roads and streets, handling bulk materials and doing many other jobs of digging, loading or grading.

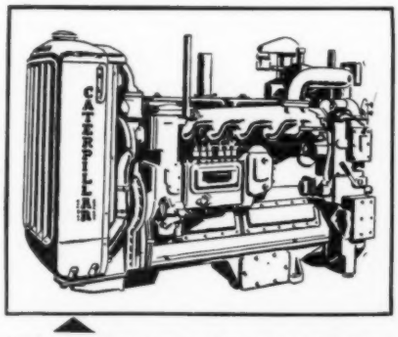
See your TRACKSON-Caterpillar dealer for full information, or write direct to TRACKSON COMPANY, Dept. RS-129, Milwaukee 1, Wisconsin.

TRAXCAVATOR

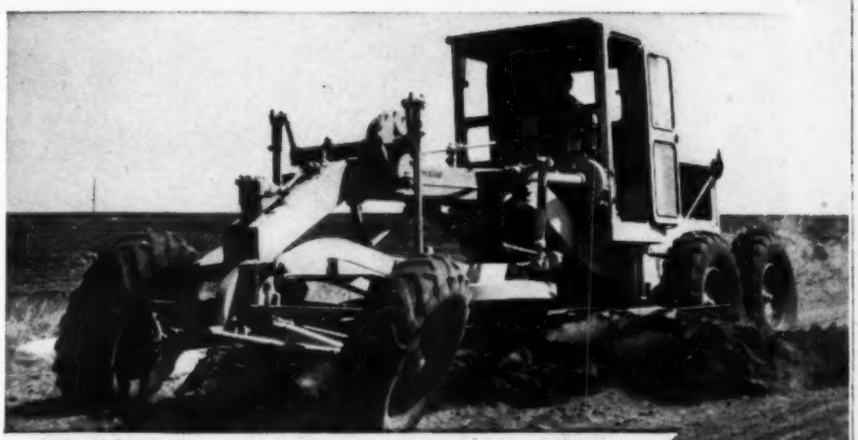
REG. U. S. PAT. OFF.

The Original Tractor Excavator

"CATERPILLAR" MOTOR GRADERS ARE *BUILT*...NOT "ASSEMBLED"

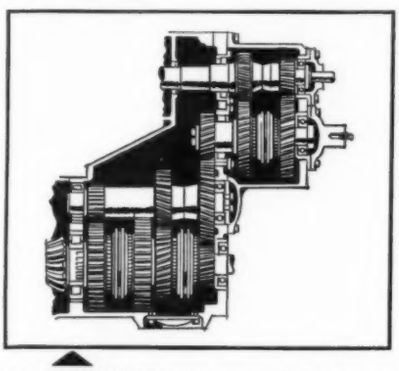


ENGINE. The heavy-duty all-"Caterpillar"-built No. 12 Motor Grader Diesel Engine is designed to function as a unit with all other parts of the machine. It has ample speed-and-power to give peak performance—plus ruggedness to meet the gruelling requirements of motor grader operation.



HIGH PRODUCTION OR PRECISION BLADING—
BOTH CALL FOR THE *BALANCED PERFORMANCE* OF AN ALL-"CATERPILLAR" MOTOR GRADER

Standard "Caterpillar" Diesel Motor Graders are priced as follows: No. 12, $10,920; No. 112, $9545; No. 212, $6435. All prices f.o.b. Peoria, Illinois, subject to change without notice.

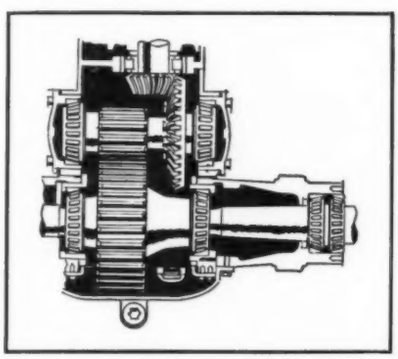


TRANSMISSION. The "Caterpillar" No. 12 Motor Grader transmission is a *constant-mesh helical-gear transmission* specially designed and fitted to heavy-duty motor grader use. Easy shifting, combined with great strength, adds to production ability and motor grader life. An independent gear-type oil pump keeps every transmission gear bathed in a full supply of oil.

EVERY "Cat" Diesel Motor Grader is *"Caterpillar"-built through and through*—from front wheels to rear—from complete engine to transmission to final drive. All mechanical parts are designed and fitted together for matched performance, correct balance, proper weight distribution, and long life. "Caterpillar" design, engineering and construction are all aimed at helping you get the utmost out of your motor grader investment. The records prove it . . . 99% of all "Caterpillar" Motor Graders ever built are *still on the job!*

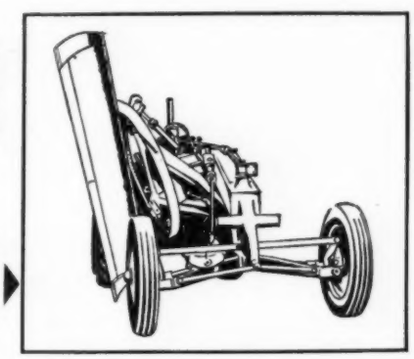
See your "Caterpillar" dealer for additional facts and figures. Meantime, write for booklet, "*'Cat' Motor Graders Do the Job.*"

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS



FINAL DRIVE. Heavy-duty engine and transmission require a rugged but simple final drive system to keep the motor grader at top working efficiency. Maximum utilization of engine horsepower is realized. High-strength bevel gears and precision-machined final drive gears are assurances of long life. Tapered bearings, throughout, keep friction losses at a minimum.

BLADE MECHANISM. The "Caterpillar" Motor Grader frame and blade system fully matches the sturdy in-built quality of the engine, transmission and final drive. Blade working positions like the one shown here can be made by the operator without leaving his position at the wheel.



CATERPILLAR

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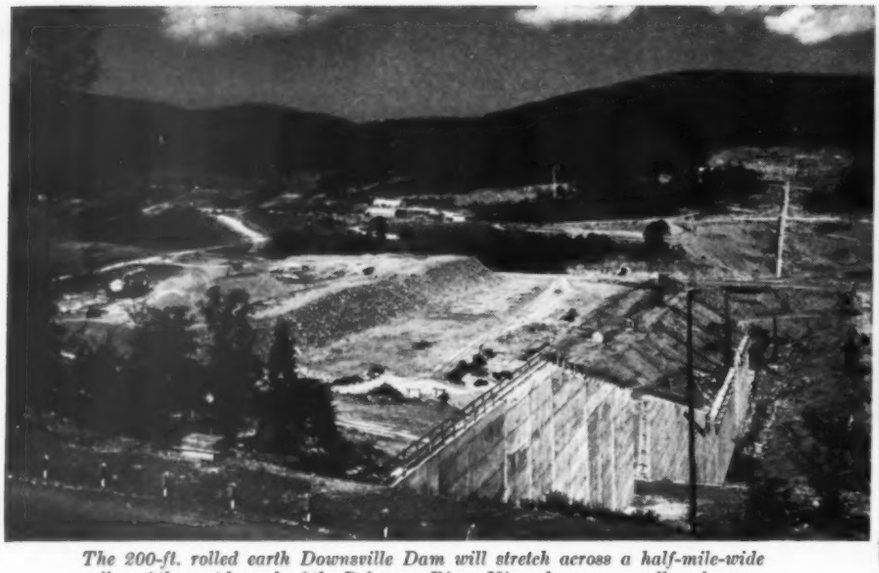
DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT



The 200-ft. rolled earth Downsville Dam will stretch across a half-mile-wide valley of the east branch of the Delaware River. View shows core wall under construction by Walsh-Perini, who also have the contract for 25-mile diversion tunnel.

Doing Every Kind of Job at Downsville Dam

A fleet of GM Diesel-powered Euclids is used at Downsville by Walsh-Perini, and by White Oak Excavators, Inc. on highway relocation.

On big construction projects everywhere, you'll find an ever-growing number of General Motors Diesels taking over more and more of the tough jobs.

Shown here are some of the many different jobs these rugged 2-cycle Diesels are doing on Downsville Dam and the $44 million tunnel to carry water toward New York City. Contractors Walsh Construction Co. and B. Perini and Sons, New York, and others on this project, rely on GM Series 71 Diesels because they start fast, pinch pennies on fuel and stay on their feet with little attention.

If you are interested in dependable power at the lowest cost per horsepower, it will pay you to check the records GM Diesels are making. Write for complete information.

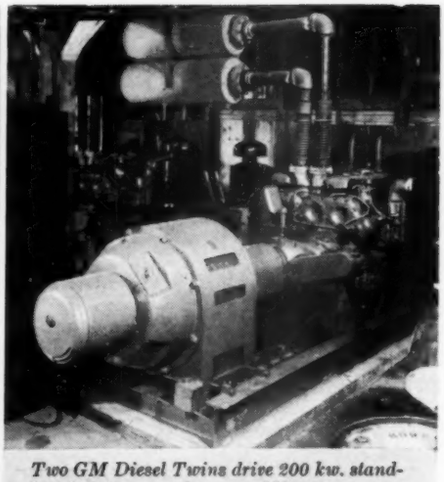
DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES... *Up to 200 H.P.* **DETROIT 28, MICHIGAN** MULTIPLE UNITS... *Up to 800 H.P.*

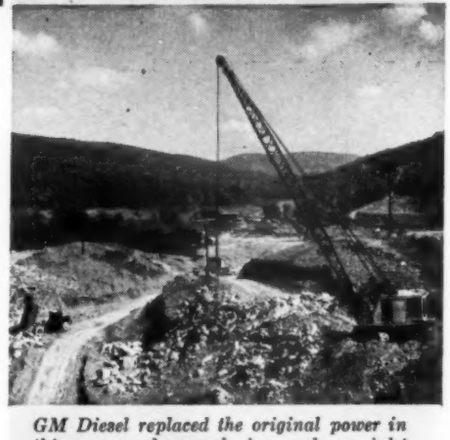
GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

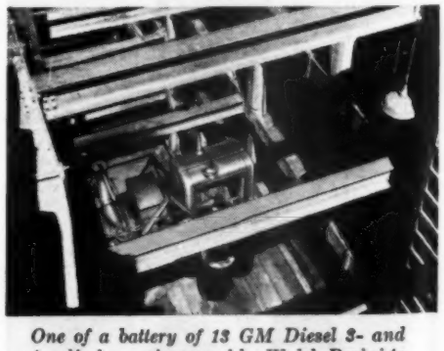


Two GM Diesel Twins drive 200 kw. stand-by electric generators providing emergency power for pumps and compressors.



GM Diesel replaced the original power in this crane, shown placing rock on inlet channel wall.

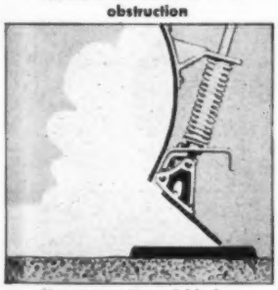
GM Series 71 2- and 3-cylinder Diesel engines power screens and conveyors on gravel-washing plant of sub-contractor, Cooney Bros.



One of a battery of 13 GM Diesel 3- and 4-cylinder engines used by Walsh-Perini to power water pumps.

TRIPPING BLADE
Faster, cleaner plowing

Tripping blade about to strike obstruction



Here the section of blade swings back over obstruction

ZING! It's over and back in normal position

Yes, Sir! You can take that snow off clean and close when your trucks are equipped with Baker Snow Plows featuring the original sectional tripping blades. These devices, on all Baker reversible and one-way truck plows, permit high speed operation with the plow right down on the pavement, without fear of damage to plows, trucks, manhole covers or road surfaces. Sectional design of tripping blades minimizes snow by-pass due to tripping action, because any by-pass is limited to the narrow section affected.

You can be sure with a Baker. Whether your needs are large or small, there's a Baker V type, reversible or one-way plow for any job and any truck — also available for wheel and crawler tractors and motor graders. So bring your snow problems to Baker — snow plow headquarters since 1908. The Baker Manufacturing Co., Springfield, Illinois.

COMPLETE NEW CATALOG

This 24 page catalog illustrates and describes the complete line of V, Reversible and One-Way Baker snow plows for all kinds and sizes of trucks. Write for Bulletin 1002.

BAKER SNOW PLOWS SINCE 1908

SPRINGFIELD • ILLINOIS

there's a

TON OF DUMPTOR STRENGTH

for every ton of payload

ASK TOO ABOUT KOEHRING HEAVY-DUTY ½, ¾, 1½, 2½-YD. EXCAVATORS

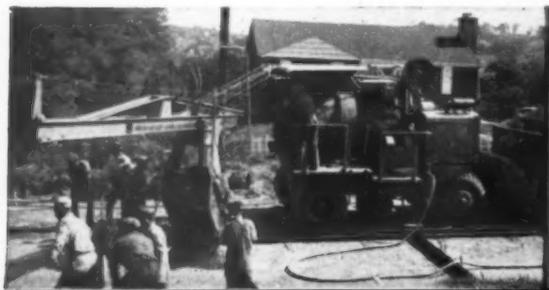
Write for illustrated bulletin on new 2½ yard Koehring 1005 Shovel.

Dumptors* stand up under the severest shocks of shovel-loading 1½ to 2½ yards or rock at a pass because they're built extra tough for rock handling. There's more than a ton of net vehicle weight for every ton of payload.

All-welded body sides, ends and bottoms are heavily reinforced with 4" channel ribs. More than triple strength has been built into the bottom . . . seasoned 1⅝" oak timbers are securely bolted between two layers of 5/16" steel plate. Steel-oak-steel construction cushions shocks of rock loading. Free-swinging, kick-out pan adds another tough 3/16" high-manganese steel plate for extra protection. Dumptor also has: rugged main frame, 8" ship-channels, heavily trussed . . . one-piece steel drive-axle housing and transmission case . . . 4" chrome steel drive axles . . . cast alloy steel "I" beam steering axle. All add extra strength to Dumptor chassis.

Heavy-duty construction like this assures you that Koehring Dumptors will stand up under your toughest assignments . . . that there will be little down time with Dumptors on your job. For complete facts, see your Koehring distributor today.

*TRADEMARK REG. U. S. PAT. OFF.



KOEHRING 16-E *TWIN-BATCH*. MOBILE . . . VERSATILE . . . controlled ELEVATED DISCHARGE. Mixes up to 30 cu. yds. per hour on streets, highway widening, bridges, culverts, retaining walls, foundations, batching. Has 60' elevating boom, 21-foot discharge height. Travels up to 6 m.p.h. on 11x20 pneumatic tires. Get complete facts in new 16-E *TWINBATCH* bulletin.

KOEHRING HEAVY DUTY

KOEHRING COMPANY

MILWAUKEE 10, WISCONSIN

SUBSIDIARIES: KWIK-MIX • PARSONS • JOHNSON

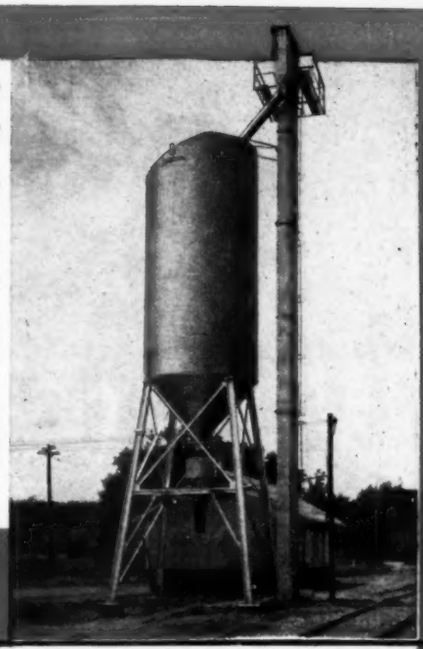
DUMPTOR BODY HEAVILY REINFORCED All-welded sides, ends and bottom of heavy-duty 6-yard Dumptor body are heavily ribbed with 4" channels. High-carbon steel gives extra strength and protection at stress points...where the abrasive action of rock handling is most severe.

KICK-OUT PAN adds an extra 3/16" high-manganese steel plate on top of sturdy Dumptor bottom . . . breaks suction of sticky materials for fast, clean dump. Big 8' x 8' top gives easy-to-hit target for fast loading over the side or end with less spillage.

1 SECOND GRAVITY DUMP . . . Operator trips body release lever . . . gravity instantly tilts scoop-shaped body. One second later, load is out and Dumptor is off for another load. No slow-moving body hoists . . . no body hoist maintenance.

Johnson Single Silos for Big Storage . . . Flexibility

Johnson all-welded single silo provides 254, 373 and 492 bbl. cement capacities . . . has gasoline or electric-driven screw conveyors and bucket elevator . . . box-car or truck receiving hoppers . . . electric bin signals . . . aeration diffusers . . . one or two 1,000 lb. cap. batchers. Adding second silo at ground level nearly triples storage capacity.



C. S. JOHNSON
CHAMPAIGN, ILLINOIS
KOEHRING SUBSIDIARY

Straight, Clean Trenches for Sewers, Pipe, Water Mains

Parsons 250 Trenchliner*, product of more than 40 years of trencher building experience, incorporates all the desirable features that make money for you on trenching jobs. Telescoping boom for easy depth adjustment. Shifts from side to side across full Trenchliner width.

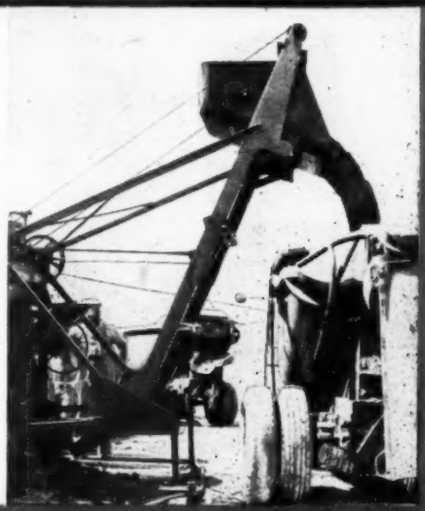
*Reg. Trademark.

PARSONS COMPANY
KOEHRING SUBSIDIARY
NEWTON, IOWA

New Tower Loader for 11-S and 16-S Dandies*

Now you can discharge concrete batches into trucks and hoppers above ground level with Kwik-Mix 11-S and 16-S Dandies. New tower loading attachment has 9'-2" discharge height. Bucket handles full batch . . . is powered by mixer engine . . . discharges automatically at top of tower. Get full facts from any Kwik-Mix distributor today.

*Reg. Trademark



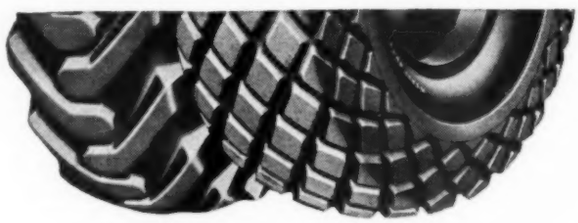
KWIK-MIX COMPANY
KOEHRING SUBSIDIARY
PORT WASHINGTON WISCONSIN

As tough as it looks

HARD ROCK LUG

YOU can tell at a glance that Goodyear's Hard Rock Lug is super-tough. Those massive lug bars spell super-stamina—that husky self-cleaning universal tread shows rugged pulling power, forward or reverse. But looks don't tell the whole story. For its inner construction is designed to stand up better on any tire-ripping, tire-bruising job. There's an extra-thick undertread to protect the rugged carcass against bruising—the lug bars armor tread and sidewalls against cuts and snags. Any way you look at it, Goodyear's Hard Rock Lug is your best bet for more dependable, lower-cost service on off-the-road tire-killing jobs. Remember, always BUY and SPECIFY Goodyear—*it pays!*

A RIGHT TIRE FOR EACH JOB



EARTH MOVER SURE-GRIP
for maximum traction on drive wheels

EARTH MOVER ALL-WEATHER
for drawn vehicles and general traction

Sure-Grip, All-Weather—T.M.'s The Goodyear Tire & Rubber Company

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GOODYEAR

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ROADS AND STREETS

December, 1949 • Vol. 92 • No. 12

Three-Contractor Team

Paves Detroit-Wayne Major Airport

Average combined pace maintained: 2750 lin. ft. per working day of 20-ft. by 11 or 13 in. slab, each contractor employing his own batch plant and paving outfit

A THREE-RING paving circus drew considerable publicity around Detroit this past season. The project was the Detroit-Wayne Major Airport [grading and drainage details, Sept. '49 R&S]. The contractors were Denton Construction Co., Cooke Contracting Co. and Julius Porath & Sons, all of Detroit. The job was of special interest for several reasons. Its 416,000 sq. yd. of heavy concrete slab made it easily the largest concrete paving job of the 1949 year in Michigan, equivalent to 40 miles of ordinary 2-lane concrete road. And the use of three contractor outfits on a single job, each working intact, isn't seen every day.

The paving consisted mainly of three runways 200 ft. wide by 5900 ft., 7000 ft. and 7650 ft, long, respectively, in a layout that will eventually include six runways and give Detroit one of the nation's most modern airfields. Pavement quantities in the initial contract awarded in June, and in a second contract let in September, included 318,000 sq. yd. of 11-in. slab and 98,000 sq. yd. of 13-in. slab.

The joint low bid of the three above-named contractors on the first parcel of 343,000 sq. yd. included $2.51 and $2.90 for the two slab depths, respectively, with the county furnishing the cement and also all steel and transverse expansion joint assemblies. The second contract consisted of some 73,000 sq. yd. of extensions to complete the runways to full length.

How Work Split Up

Each contractor erected his batch plant at a corner of the field nearest to his assigned working zone. Each moved in with his own crew, as though on a project of his own, Denton beginning June 20 on the NW-SE runway, Porath starting July 14 on the E-W, and Cooke beginning July 27 on the SW-NE runway. With the three setups, each outfit was able to work with its accustomed equipment and act as a well-oiled, experienced team.

That the scheme paid off was attested by the yardage figures. Daily progress for the season averaged about 1250 lin. ft. per paver, or 2,778 sq. yd. The Denton organization's

★ Denton Construction Co. used a tractor-towed strike-off screed for bar mat placement; a 34-E dual-drum paver (Rex); a single finishing unit; joint and spray machines. Split-second timing by a seasoned crew and extra capacity at the plant, aided in maintaining high yardages

★ Air photo taken November, 1949, showing old Romulus field, new runways for Detroit-Wayne airport, and further improvements under contract or planned

best day was 1756 ft. of 20-ft. lane (925 batches), and it approached this figure on many days. Porath's crew, not to be outdone, chalked up a 1775-ft. peak day. Cooke's organization also made excellent progress despite more short-lane runs.

The contractors, while each starting on one runway, eventually split up the work, assisting each other with assigned lanes to insure steady utilization of equipment.

Slab Design Details. The Detroit-Wayne Major Airport is designed for a 100,000# wheel load. Bar mat reinforcement is 53.4 lb. per 100 sq. ft. for the 11-in. and 63.5 lb. for the 13-in. pavement. A 9-in. sand blanket was specified under all paved areas, the material extending beyond the edge drains.

Runways are designed with ten 20-ft. lanes, each having a ¼" x 2¼" preformed longitudinal dummy joint. All longitudinal lane joints are keyed, and tie bars are included for the outer lanes. Doweled expansion joints are provided at intervals of 135 ft., with transverse dummy joints every 15 ft. and every third dummy joint doweled as a dummy contraction joint. Expansion joints have 1" x 20" slip dowels at 10-in, ctrs.; transverse contraction joints have 1" x 18" plain dowels at 10-in. ctrs.

Air entraining concrete with Vinsol Resin interground was used, Darex also being added at the plants as required to maintain specified air content.

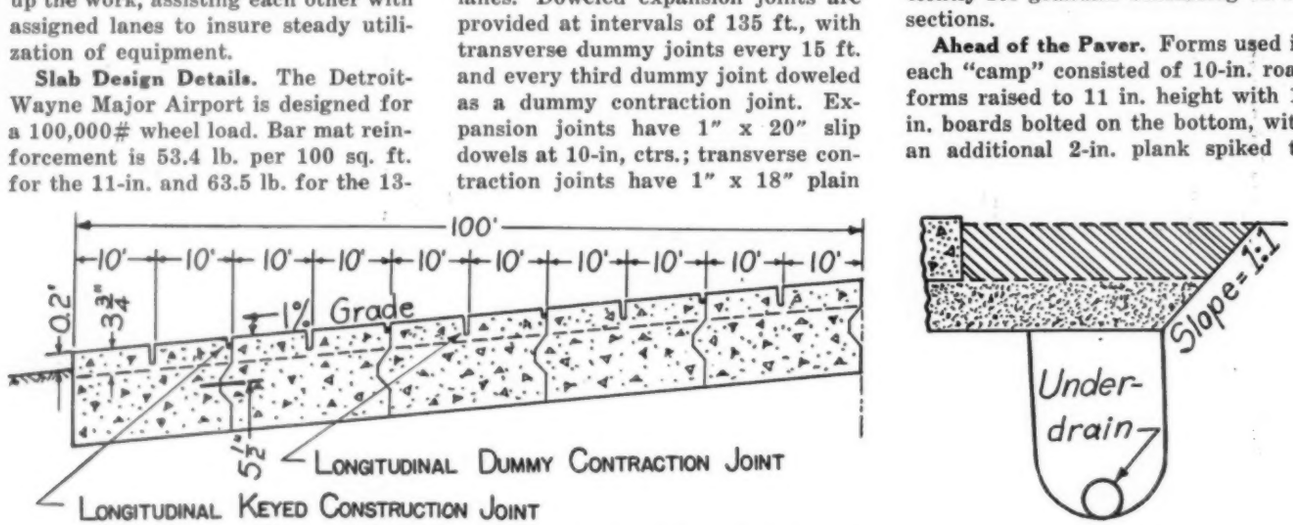
Construction Details

Some of the details of operation are shown in the accompanying tabulation. Taking the tasks in sequence, the following notes cover the high spots:

Subgrade Blanket. The 9-in. sand blanket specified under all pavement areas was supplied for the entire job by a subcontractor, who delivered by truck except for one runway where Tournapulls were used. Final spread was with dozers and motor graders. Satisfactory compaction was obtained by running a heavy crawler tractor back and forth a few times while the sand was wet.

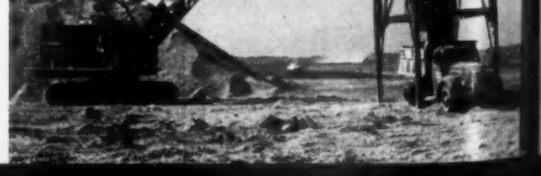
Edge Drains. The seven miles of 6-in. tile subdrains required along all pavement edges were also installed by subcontractors using power trenchers. Backfill: 12 in. depth gravel over pipe, rest of trench filled with sand. A power conveyor belt attachment under the truck tailgate served efficiently for granular backfilling on all sections.

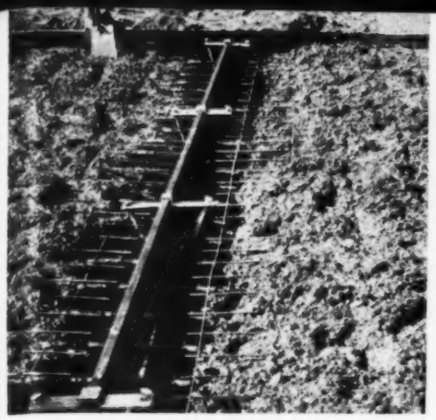
Ahead of the Paver. Forms used in each "camp" consisted of 10-in. road forms raised to 11 in. height with 1-in. boards bolted on the bottom, with an additional 2-in. plank spiked to

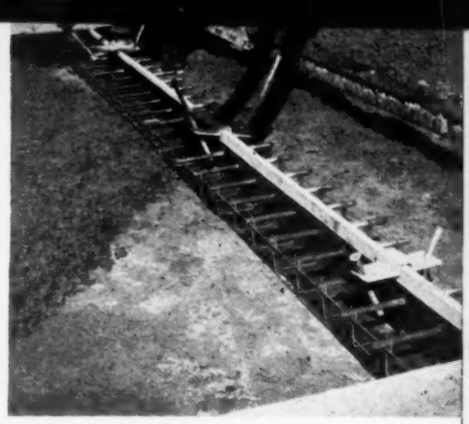


★ Runway cross section for 11-in. slab. Edge drains with granular backfall specified along all runways

★ Like the other contractors' batch plants, the Cooke plant was laid out for straight-path truck loading. (Right): Denton's 2-yd. capacity crane frequently moved the 75-ton stone bin as the stockpile size changed, in order to keep swing arc to a minimum, speed loading, and cut operating cost







★ Porath firm employed a wooden hood (not shown) for protecting each doweled joint assembly during concreting. Adjacent concrete deposited to height shown, then hood removed and remaining concrete carefully placed to envelop the dowels. (Right scenes): Two workers set expansion joint assemblies (Keystone premolded joint)

the ground being also used where the slab was 13 in. thick. Form pins 30 in. in length were hand-driven, pulled with hand-operated pullers, and manually handled on and off trucks. Two contractors used power finegraders and one used a form-riding screed drawn by a crawler tractor.

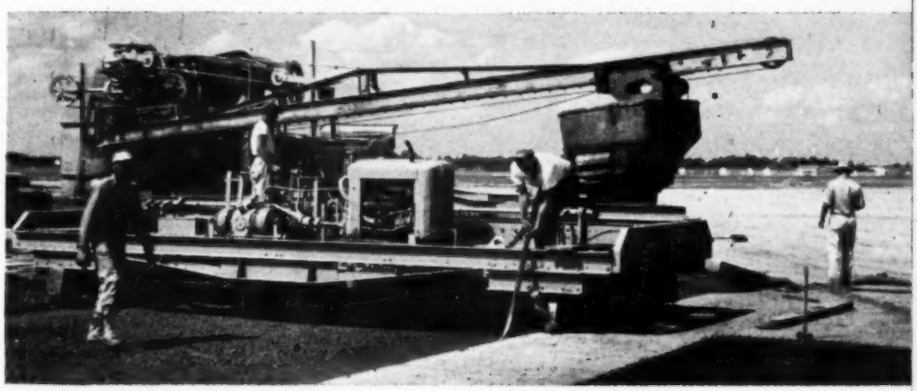
Porath's outfit included a subgrade sprinkler truck consisting of a 700-gal. tank and two spray bars, fore and aft, mounted on a Ford truck.

Paver. Each contractor used a single 34-E dual-drum paver, finding this more advantageous than a two-paver set-up due to the number of lane changes and other considerations.

Spreading and Finishing. Denton's and Porath's procedure was to strike off concrete at mat level with a tractor-drawn screed, and use a single finishing machine for both spreading and finishing functions on the top lift. Cooke used a modern spreader for both lifts, alternating the setting as required, and a finishing machine for the top lift. Both methods resulted in satisfactory pavement smoothness and the "sidewalk superintendents" were divided as to which method was best from the contractor's standpoint.

Each contractor followed with a pair of men on long-handled aluminum floats. Burlap drag was specified, and membrane cure cover was machine applied.

Joints and Steel. Expansion joints



★ Cooke Contracting Co. had new modern equipment throughout. Seen here: Ransome 34-E dual-drum paver, and Blaw-Knox spreader which was set alternately to strike off at mat level and finish level

required every 135 ft. consisted of dowel and premolded joint assemblies, which were set by two men and held in position by three or four pairs of subgrade spikes during concreting. Porath's men placed a wooden hood over each dowel assembly immediately after it was anchored in place, leaving the hood as a protection until concrete was well built up on both sides. The engineers praised this detail, common on Michigan state road work.

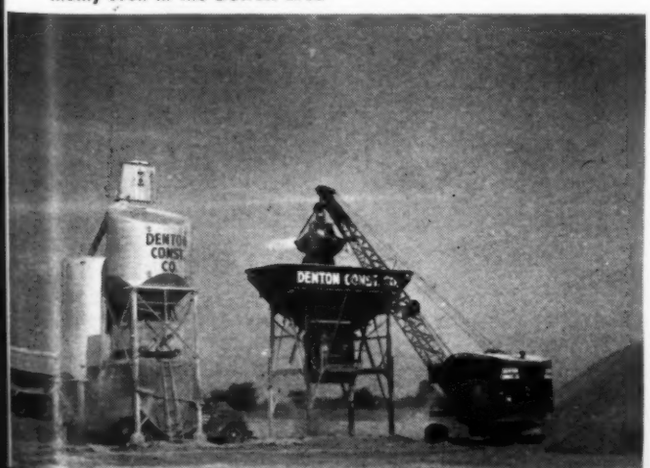
Dowels required at every third dummy joint were positioned in a wire chair frame and pinned in position. Special care was required to keep these dowels in accurate position.

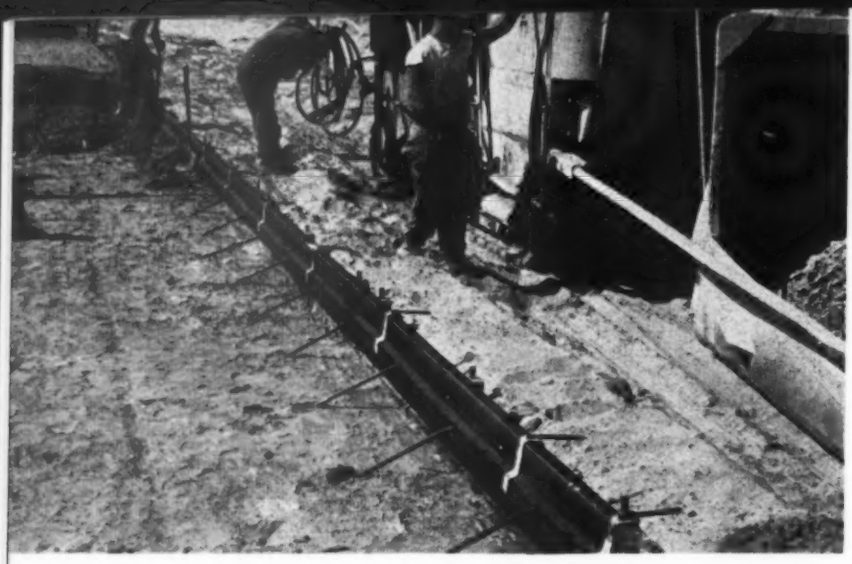
Transverse dummy strips were pressed into position with a shield using a two-man pressing frame. Longitudinal strips were machine-placed. Two contractors used Flexplane machines. Denton's machine was shop-built, being aluminum throughout for easy lifting and moving.

Batch Plant Details

All three of the batch plants were laid out for wide truck swings, straight-line loading, double batchers being employed for quick loading of 2-batch trucks. Denton's plant had the largest bin and clamshell capacity; his stone and sand bins each held 75 tons, and clamshell buckets were 2-yd. and 1½-yd. size, respectively,

★Denton's batch plant included extra large capacity of everything. (Right): Porath's plant included two bulk cement stations at the start, one soon being replaced by an auxiliary silo. Note bulk cement delivery trailer, commonly seen in the Detroit area



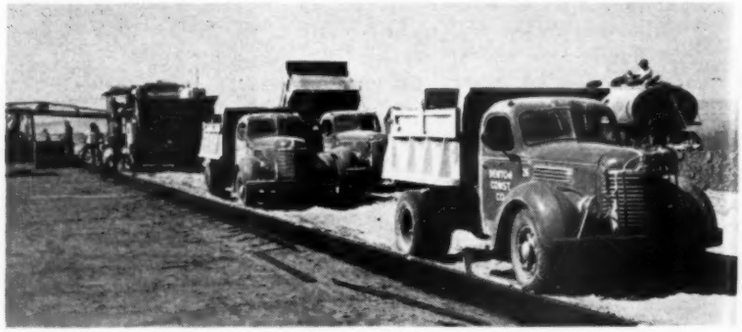


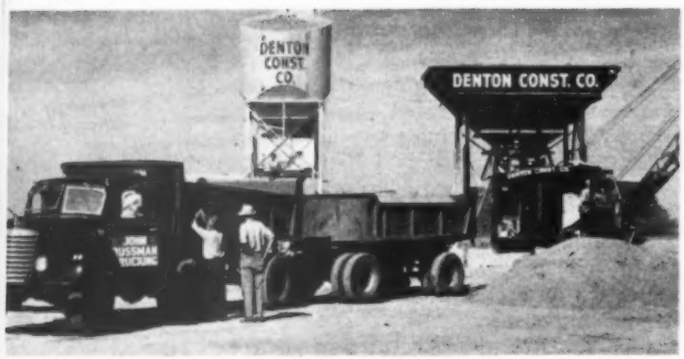
On the Denton Section

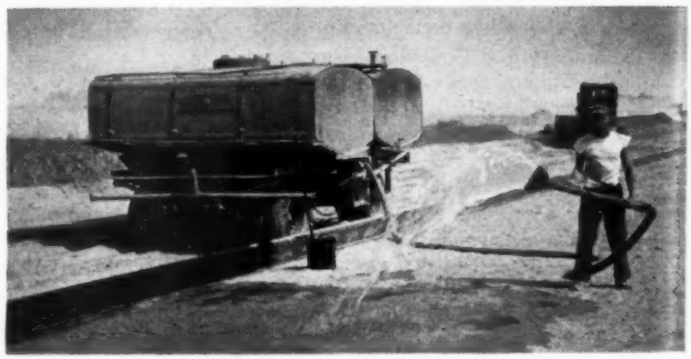
★ Labor-saving idea: temporary metal clips inserted down over the road forms, to hold the key forming strip in place until concrete is placed. One man moved clips ahead and reset, checked position of strip, straightened tie bars (bent down here due to momentary shortage of chairs)

★ (Lower Left): Two 2300-gal. tank trailers alternated in feeding the Denton paver. GMC truck

★ (Below): One truck "up" and second and occasionally a third truck "on deck," was the ideal dispatching toward which Denton worked





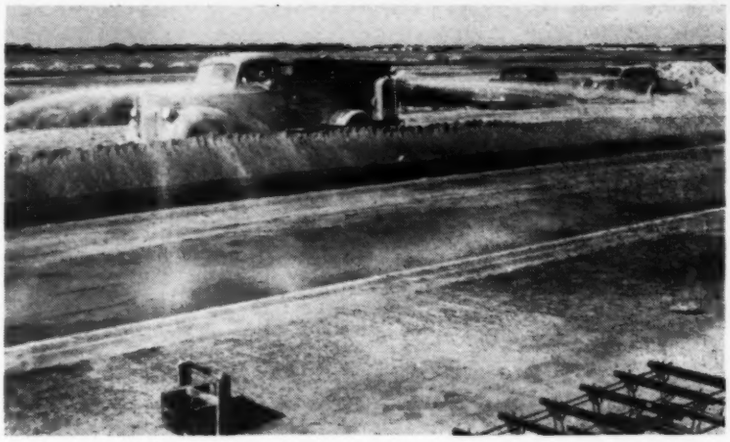


★ Trucking contractors who supply aggregates around Detroit commonly tow a dumping trailer behind the dump truck, cutting costs on long hauls despite time-consuming business of unhooking to dump the truck. Trailer body dumped via hydraulic hose coupling from truck engine

★ (Upper Right): Sprinkler outfit—two demountable tanks on a dump truck bed

★ Rubber compound heated in double-walled vats, employed on all projects. This is a Sealz-Meter outfit (U.S. Rubber)

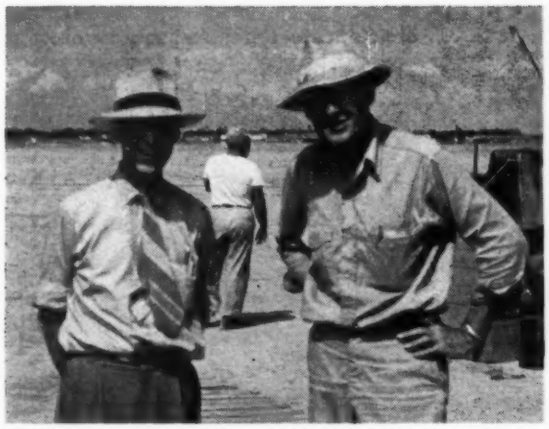
★ (Below): Power for electric motors on the cement elevator and screw, and for lighting, supplied by trailer-mounted GM diesel generator unit



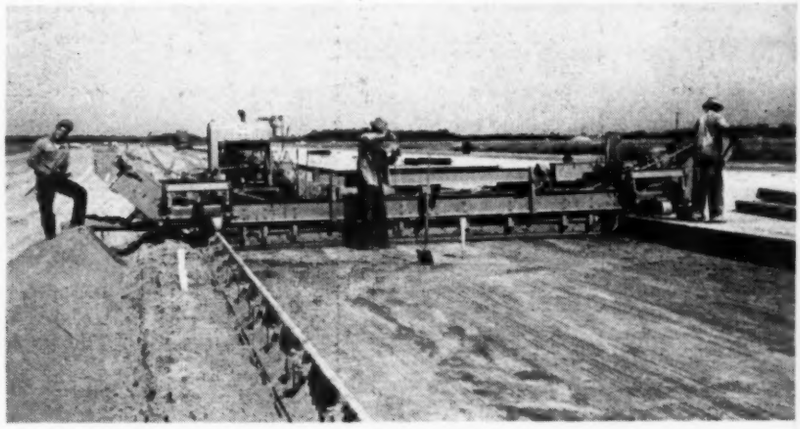
★ Porath's job. Sprinkler truck had a vertical spray bar front and back. Note dowel assembly for dummy contraction joint, in foreground

★ Straight-line load path and twin hoppers also were factors in enabling Porath to turn out over 800 batches on peak days

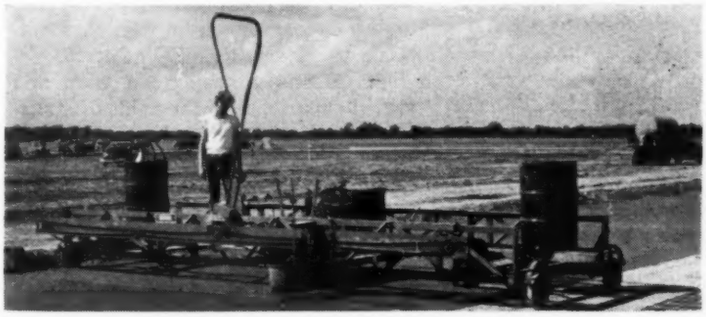
At Porath's End of the Field

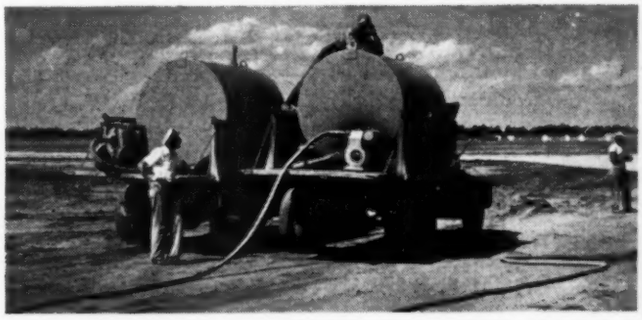


★ Project engineer J. D. Benjamin with Cooke's superintendent Jack Hohnke



★ Buckeye finegrader had a relatively easy job spreading sand blanket





★ Above): All three contractors used a Flex plane spray machine for applying Tru Cure curing liquids

Cook's Outfit

★ (Above right): Another solution to the paver supply problem—1,000-gal. tanks set in dump truck bed

★ Tractor-mounted boom was handy for moving equipment from lane to lane. (Allis-Chalmers HD7 tractor with Buckeye dozer)

Detroit-Wayne Airport Job "at a Glance"

Method and Equipment	Denton Const. Co.	Cooke Contracting Co.	Julius Porath & Sons
(Preliminary)			
Edge Drains	(Subcontractor, Boan Construction Co.); Cleveland trencher; power belt for granular backfill; dozer earth backfill		
Subgrade Sand	Joseph Plozai & Sons. Spread by Austin-Western grader; compacted by D8 Caterpillar tractor while moist	Subcontractor delivered sand by truck. Spread by D8 Caterpillar and TB 24 International dozer and No. 12 Cat. grader	Under Plozai, Sand delivered by Tournapulls; spread by No. 12 Caterpillar Grader; compacted by D8
Road Forms Fine Grading	Meta Form RB Subgrader	Blaw-Knox Cleveland Trailblazer screed drawn by HD-7 Allis-Chalmers tractor	Meta Form RB Subgrader
(Paving)			
Bar Mat Reinf. Expansion Joints Dummy Dowels	53.4# per 100 sq. ft. for 11-in. slab and 63.5# for 13-in slab Keystone premolded expansion joints at 135-ft. intervals. 1½"x20" dowels set in baskets from Ceco Steel Prod. Corp. & Concrete Steel Fireproofing Co. Dowels 1"x18" @ 10" ctrs. under every third dummy joint		
Dummy Joints	Spaced every 15 ft. Keystone premolded strips (¼"x2¼") in transverse and longitudinal dummy joints		
	Shop-built joint machine (all aluminum for easy moving)	Flexplane	Cleff plane joint machine
Paver	Rex 34-E dual	Ransome 34-E dual	Ransome 34-E dual
Water Supply	2-2300-gal. tank trailers with GMC truck for paver; 2-300 gal. tanks on truck for subgrade	3-1000 gal. tank set in dump truck beds, paver and subgrade sprinkling	2-2000 gal. tank trailers for paver; 700-gal. tank with sprinkler bars fore and aft on Ford truck for subgrade sprinkling
Concrete Spreading	Screeded at bar mat level by heavy strike-off, towel by Allis-Chalmers HD7 tractor	Blaw-Knox spreader alternating at mat and top level	Screed at mat level drawn by D2 Caterpillar
Concrete Finishing	Jaeger-Lakewood oscilating screed for top-lift spread and finish	Blaw-Knox finisher for top lift	Jaeger-Lakewood finisher for top lift spread and finish
Concrete Curing	Tru Cure materials applied by Flexplane machine	Tru Cure materials applied by Flexplane unit	Tru Cure applied by Flexplane machine
Joint Sealing	Seals (U.S. Rubber) compound applied with Sealz-Meter heater	Sealz and Sealz-Meter	Paraplastic, with Aeroil heater
Lane Moves	Skids and tractor	Bay City crane for heavy units Allis-Chalmers HD7 tractor with rear boom for light units	Lorain Moto Crane
Berm Leveling	Austin Western 99H grader	Austin Western 99H grader	Caterpillar No. 12 grader
Batching and Materials			
Batch Delivery	5 to 8 contractor-owned trucks, 1 Ford, 7 KB 6 or 7 Internationals	Rented Fords, Chevrolets and others	Rented Fords, Chevrolets and others
Stone Bins	75-ton Butler (Twin batch equipment used by all contractors)	Butler 50-ton	60-ton Blaw-Knox
Sand Bins	75-ton Butler (Twin batch equipment used by all contractors)	Butler 30-ton	40-ton Blaw-Knox
Bulk Cement Station	Butler 350 bbl. silo. Butler 220 bbl. auxiliary Ingersoll-Rand compressor	Butler silos 350 and 250 bbl. capacity. I-R compressor	Butler 640 bbl. silo capacity including auxiliary
Aggregate Handling	Koehring crane, with 2-yd. Erie bucket on stone. Koehring 304 with 1½-yd. Owen bucket on sand	P&H crane 1½-yd. Owen bucket on stone Northwest 1-yd. clam on sand	Two Northwest cranes with 1½-yd. and 1¼-yd. buckets
Power Source	GM diesel generator unit on single-axle trailer for cement plant motors	Gasoline motor on cement plant	Gasoline motor on cement plant

for stone and sand. Of special interest was the Denton crane operator's practice of picking up the stone and sand bin frequently and setting it down in the most advantageous position as his stock pile size dwindled or increased. His idea was to keep his swing arc at a minimum, while not getting the bin too far out of line for straight-path loading of trucks.

Trucks on this project were required to load stone, then cement, then sand, to avoid wind loss of cement.

All contractors here, in common with prevailing practice in the Detroit area, provided large silo capacity for bulk cement. The individual capacities were 650, 600 and 570 bbls., respectively, including auxiliary silos. This practice has been encouraged by the cement companies to help contractors work flexibly with hauling contractors who supply direct from mill to job. Several such contractors in the locality are equipped with modern 150-bbl. cement delivery trailers.

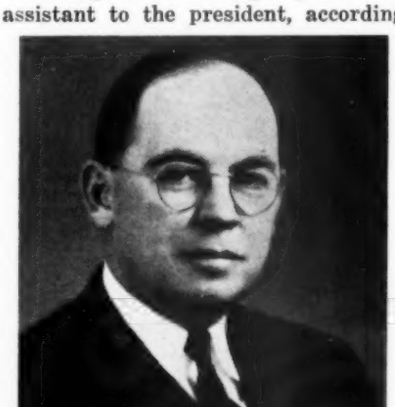
Acknowledgments

Charles Leudman was superintendent for the Denton Construction Co., Jack Hohnke for Cooke Contracting Co., and Earl Wood for Julius Porath & Sons.

Work on Detroit-Wayne Major Airport will continue into 1950, the grading contract for a fourth runway having been let. The improvement program is being carried out with state, county and CAA federal funds under sponsorship of the Wayne County Road Commission; LeRoy Smith, airport manager; Henry E. Baker, airport superintendent; J. D. Benjamin, project engineer, and Paul Glaser, asst. airport engineer.

G. Donald Kennedy Joins Cement Association

G. Donald Kennedy, vice-president of the Automotive Safety Foundation, and former state highway commissioner of Michigan, will join the Portland Cement Association January 1 in Chicago as consulting engineer and assistant to the president, according to announcement from the Association's president, Frank T. Sheets.



G. Donald Kennedy

Mr. Kennedy has had a wide and varied experience in the fields of structural, municipal and highway engineering. As deputy state highway commissioner of Michigan and later as State Highway Commissioner, he made an outstanding record as an able engineer and administrator, and was regarded in highway circles as one of the most capable men in the country. This esteem was evidenced by his election as President of the American Association of State Highway Officials. He also received, in 1948, the Bartlett Award for "Outstanding Contribution to Highway Progress."

Since 1943 Mr. Kennedy, as vice-president of the Automotive Safety Foundation, has directed the activities of the Foundation in furtherance of the development of sound, long-range programs for highway improvement.

EDITORIAL

★ Day Labor Construction—When Justified?

Excerpts from a talk, "Day Labor—a Cancerous Growth," given before the ARBA's Fall Conference, Washington, D.C., November 7-8. Presented without comment except to note that a few highway departments, state and county, enjoy the services of outstanding able and efficient engineers and administrators. Now directing force-account highway repair and construction organizations, these leaders are achieving a relatively high degree of efficiency and loyalty on the part of their staff personnel, considering the inherent obstacles Mr. Gay describes. —Editors.

By Archer B. Gay
Secretary-Treasurer, Virginia Road Builders' Association, Richmond, Va.

THE two recognized methods employed to accomplish public works construction are generally known as "the day labor method" and "the contract system." The question of when and where it is proper to employ the day labor method is one which has attracted the attention of both engineers and contractors over a period of years.

A reference to the printed Proceedings of American Road Builders' Association will reveal that we have, upon numerous occasions, discussed the ever present problem of construction of highways by the day labor method. We have, through the medium of these studies, endeavored to analyze the respective merits and demerits of both this and the contract system. In each case, we have reached the inevitable conclusion that the contract system is the sound, business-like way to accomplish public works construction. Our conclusions have, in the past, been reached and justified because of the economic and efficiency record of the contract system.

Nor have we been alone in undertaking these studies and engaging in these discussions. The Bureau of Public Roads has, on occasion, required the various states to construct certain types of projects by the direct labor or force account method. These projects were selected after bids had been taken by the awarding authorities in order that their actual costs might be pre-determined. Commissioner Thomas H. MacDonald of the Bureau of Public Roads, reported these experimental projects to the House Roads Committee in 1935. He stated that "in practically all cases, the cost has been higher by force account—some materially higher." He concluded by stating that "there is no question about the relative economy of contract work versus force account work under the supervision of the public bodies." These conclusions were also reached by other public authorities wherever and whenever accurate records of costs were kept on such force account or day labor construction.

Incentive Problem

This is the case for economics. We might multiply it by a thousand instances at every level of public construction. The conclusions in each case will follow the same pattern. We might well ask the reason for such conditions and answer the question by stating that men lose their incentive whether they be workmen, supervisors or engineers, when they are not stirred by the thought of personal loss or gain or lashed by the keen whip of competition.

Despite these striking proofs of extravagance and inefficiency, the day labor method of doing construction work continues to raise its head and seek complete dominance of the field of public works. Perhaps this field is especially attractive to the advocates of that system because of the fact that the volume is large, or because it is being supported in part by Federal funds and is, as a consequence, spread throughout the entire country. Thus it offers its advocates rewards in the field of larger patronage possibilities and of political organization. Since highway construction is largely supported by special taxes on motor fuels, it also has a large financial field in which to range without hitting the general public's pocketbook with new direct taxes.

We might further continue our inquiry into this question of day labor construction by asking what its advocates claim for it. Their first claim is that it saves the contractors' profit or that it is necessary in some instances as a governor to keep the contractors' prices in line. Further, the advocates claim that the day labor system permits changes in the original design or enlargement of the scope of the work without the cumbersome negotiations necessary if the work were under contract.

In the third place, this method is advanced for emergency projects where time is not sufficient to permit the preparation of plans and specifications or where accurate estimates of quantities are not available. Coupled with these reasons day labor advocates also cite the fact that the owner always has direct control of the work at all times and can, therefore, operate more efficiently than the contractor.

There are, of course, numerous other reasons advanced for the day labor system by its supporters. Most of us are so familiar with them that we shall not tire you with repetition.

Disadvantages Reviewed

We might observe, in passing, that the system has many disadvantages.

1. It is highly vulnerable to political manipulation and no certain means are provided which will assure the owner of the ultimate cost of the project in advance of its actual construction.

To establish such a method demands that much of the construction funds must be expended for purchase of equipment, the establishment of facilities for its maintenance and the employment of a staff of mechanics and supervisors for this purpose who make no actual physical contribution to the construction of the project involved. As a specific example of this, we might cite the case of the $50,000,000 bond issue for secondary roads in North Carolina. Here the state highway and public works commission took from this fund $5,000,000 for the purpose of purchasing machinery to be used in construction under the day labor method. This action was objected to in a petition signed by the Carolina Road Builders' Association and others interested in

the highways of North Carolina. Later a suit to obtain a permanent injunction, restraining the State Highway Commission from such purchases was filed by the president of the Contractors' Division of the ARBA, Nello L. Teer, of Durham, N. C. The results of this action are not yet known, but the trend toward day labor is clearly indicated.

2. The day labor system requires employment of laborers, mechanics, operators and supervisory personnel who have no monetary interest in the project under construction. These men, in most cases, lack even the small incentive offered in the hope of assured future employment. For this reason the employees on such projects are always prone to perform poor or at least indifferent work. Time is the essence of every contract when it is undertaken by the private contractor. On the other hand when construction is performed under a governmental agency, time is of no particular moment. The work drags, efficiency of personnel decreases and material losses and wastes mount until the cost of the project is bound to reach staggering proportions. Meanwhile, the public is deprived of the service which the particular construction was designed to render.

Worker Loyalty

3. Because of the common practice of making purchases from the lowest price bidder in the material field, the public authority seeking to be its own contractor seldom, if ever, is able to build up any sense of loyalty or to secure the full cooperation and support of these suppliers which the contractor has and expects. Mr. MacDonald adequately phrased the whole difficulty in his report to the House Roads Committee in 1935, when he concluded: "The principle reason, I think, is that it is very difficult to get the same loyalty and performance from either material supplier or the employees on the job, to the public, as the contrator can secure."

4. The day labor system usurps the function of properly constituted organizations, perfected over the years, whose experience and "know-how" are the basis of any day labor proficiency and economy in construction. In every sense, the modern contracting firm specializes in a certain type or kind of construction. Where the public performs its own work under the day labor system, such specialization is not possible and the work suffers for the lack of it.

5. It means increasing, far beyond the normal and necessary level, the vast number of government employees. This, in turn, tends to increase the patronage privileges of those in authority and offers innumerable opportunities for the manipulation of votes in a particular locality. The monetary cost of the project may also offer opportunities for political manipulation and trading of favors, because this type of construction is seldom, if ever, controlled by fixed appropriations.

6. The day labor method would seem twice as costly since it tends to reduce the income of the government at all levels. In the final analysis such income is always obtained from private business and day labor tends to remove one more source of income from the already over-taxed public treasury. Thus, in effect, by employing this means of public construction, we are burning the candle at both ends, for while it takes income from the government, the project usually costs more than if performed by private contractors and the net result is a loss both at the income and expenditures ends.

The final result is that day labor construction sets up competition with private business which does not result in any advantage to the government or the public. If, for no other reason, it should be opposed on this ground since it is perversive to the very fundamentals of our American system of government. It destroys private industry by confiscating its market for services and/or products which it has to offer. It destroys that which has made the United States the greatest nation on earth—that spirit of competition and the ingenuity which it develops in the performance of its particular type of work.

In the beginning, however, we stated that the public had lost interest in almost every phase of our highways except the actual road surface and the means of transportation which it provides. Thus it would seem that the time has now come in our national thinking when we must justify the continuation of the contract system of construction; when we must incise the cancerous growth of day labor from the field of public works; for reasons other than those bound up with the purely economic aspects of the situation. We have prided ourselves on the purely prosaic things such as costs, efficiency and native ingenuity as these have characterized our system.

Safety Talks for Your Foremen

The Executive Committee of the National Safety Council's Construction Section has issued a volume containing 58 "Safety Talks for Construction and Maintenance Foremen" which can find wide application in industry.

Written in the language of the foreman and covering a wide range of subjects, the talks take no longer than five minutes each to present. A page of instructions to the foreman tells him how to use the talks—as sources of information, not as speeches to be read. This page also gives pointers on how to conduct a "tool box" or gang meeting.

The talks fall in two categories, General and Operations. The first deals with principles of accident prevention, protection to the public, first aid, personal protective equipment, fire, housekeeping, handling and storing materials, heavy equipment, material hoisting, fiber and wire rope, ladders and scaffolds, falls, electricity, hand and portable electric tools, power saw operation, welding and cutting, and transportation.

Operations covered in the second grouping are demolition, clearing, excavation, concreting, steel erection, blasting, and pile driving.

Copies of the manual are available to non-members of the National Safety Council at $3.00 per copy up to 10 copies; $2.60 each, 10 to 100 copies; $2.50 each, 100 to 1,000 copies; $2.40 each for larger quantities. Member prices one-half these figures.

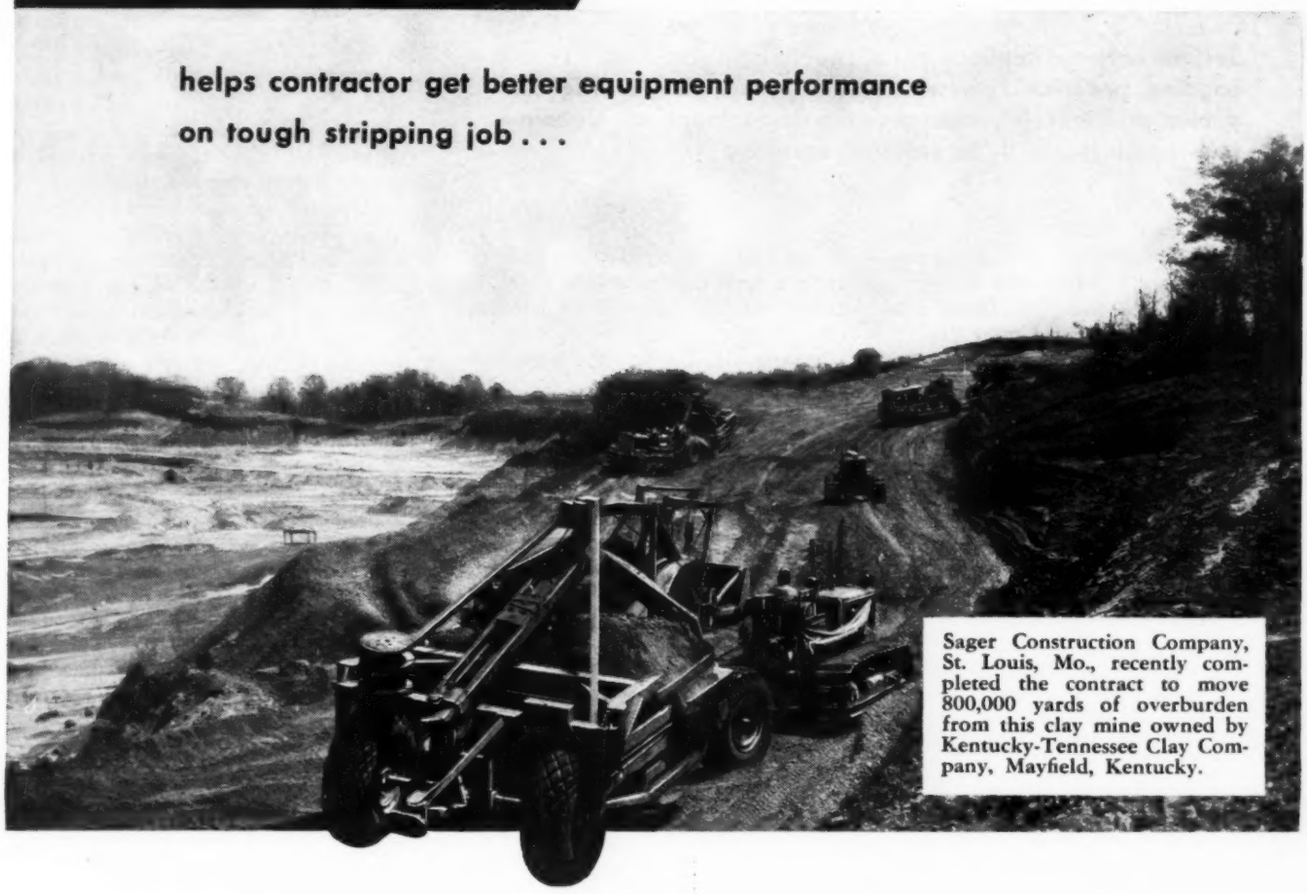
Thoughts on the Care of Equipment

"We cannot stress too strongly that the equipment will last a long time providing it is given proper care by the operators and mechanics. We have allocated parts vans, portable shop buildings, and modern repair equipment to give the outfits the tools to do the job. But there is the human element involved and the supervisors will continue to weed out the men who for one reason or another bang up the equipment. We are proud of the fact that the majority of the men handle the machinery with the utmost diligence."

(From the "Hard Roader Outlook," employe's magazine published by Koss Construction Co., Des Moines, Ia. This contractor was the Nation's No. 1 builder of concrete in 1948, having completed over a million square yards.—Editors.)

All-weather protection with GULF LUBRICANTS

helps contractor get better equipment performance on tough stripping job . . .



Sager Construction Company, St. Louis, Mo., recently completed the contract to move 800,000 yards of overburden from this clay mine owned by Kentucky-Tennessee Clay Company, Mayfield, Kentucky.

"WE operated during all seasons of the year on this job, so we had to use petroleum products that would keep equipment rolling in spite of big temperature variations," says Troas Joiner, Superintendent of the Sager Construction Company. "Hot or cold, mud or dust, we've had top-notch performance from every unit with Gulf lubricants and fuels—and extra hours of trouble-free operation."

Another big earth-moving project where Gulf quality lubricants and fuels work as a team to keep the job rolling smoothly.

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GULF

Contract Road Building

Championed at ARBA Fall Conference

Serious national implications of "socialistic" day-labor road-building practice reviewed. Conference also spotlighted public relations job and growing importance of highway transportation in U. S. national economy

WHILE virtually all road construction is performed by contractors where federal-aid funds are involved, enough day-labor or "force account" roadbuilding is being done by state and local highway agencies to cause concern to believers in private enterprise. Thirteen percent of all road construction, representing many millions of dollars, was completed without benefit of private contractors since January, 1946, according to BPR figures.

This growing trend was one of the discussion topics at the American Road Builders' Association's Fall Conference, held Nov. 7-8,, at Washington. Spokesmen for state interests, the Federal Government, contractor groups, and the American Federation of Labor all united here however to describe the contract system as the most economical and efficient approach to creating and maintaining the nation's highways.

The day-labor method of hiring individual workers, often through political influence, was termed "a cancerous growth we must incise" in a talk by Archer B. Gay of Richmond, Va., a member of the Road Builders' committee cooperating with the American Association of State Highway Officials.

"It is particularly attractive to the advocates of the system because the volume of public works is large, or because it is being supported in part by Federal funds," he said.

"Thus it offers its advocates rewards in the field of larger patronage possibilities, and political organizations. Since highway construction is largely supported by special taxes on motor fuels, it has a wide financial field in which to range without hitting the general public's pocketbook with new direct taxes."

Day-Labor Criticised

Mr. Gay, who also is secretary-treasurer of the Virginia Road Builders' Association, said that the day-labor system was "highly vulnerable to political manipulation and no certain means are provided which will assure the ultimate cost of construction."

Charles M. Upham, engineer-director of the association, remarked:

"There are plenty of instances where the payrolls, under the individually hired, day-labor method of highway building, increased excessively just before election."

Contract construction of highways always receives preference in expenditures of Federal funds, according to A. C. Clark, acting deputy commissioner of the United States Bureau of Public Roads. "This procedure is followed except in a few special cases when it can be definitely shown that it is in the public interest to use the day-labor method," he said. About 99% of Federal-aid road construction since Jan. 1, 1946, has been performed by contractors, he added. Statistics showed that 13% of the work by other agencies was performed by state-employed or day labor.

Decreases in road-building costs, including those for materials, have brought about steadily falling bid prices, which are now 10% below the 1948 peak with hundreds of new contractors entering the highway field, according to Mr. Clark. "Day-labor activities, therefore, are largely supplementary to contract operation in construction work," he said. "However, the ever-present threat of resort to extensive day-labor construction is another competitive factor which provides additional incentive to contractors to strive for greater economy in their work."

A. F. of L. Views

Lewis G. Hines, special representative of the American Federation of Labor, said that organized labor had found the competitive system of bidding, known as the contract method, to be the most economical way of building highways.

"Generally speaking, the competition for such jobs restricts the profits in each to a reasonable amount," said Mr. Hines, "but it is the glaring exceptions that give credence to the claims of politicians that work can be done cheaper by day labor. These exceptions must be eliminated and the contractors themselves must assume the responsibility to see that this is done." He emphasized that labor preferred to work for private owners rather than for the state or any of its subdivisions. "Labor believes in

(*Continued on page* 24)

ARBA Officer and Director Nominees

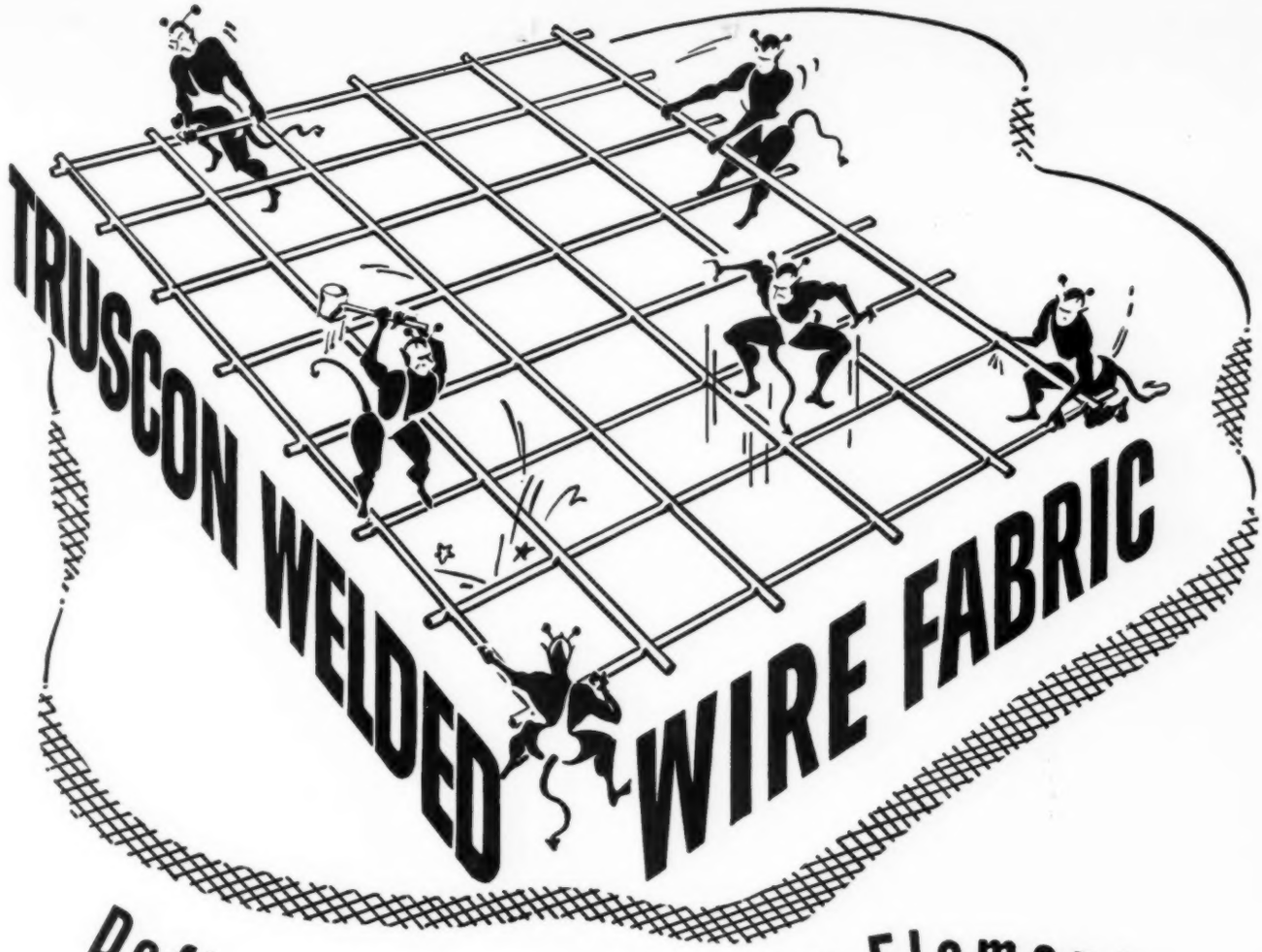
Nominating committee selections for 1950 leaders of the American Road Builders' Association are as follows, subject to formal ratification by the ARBA membership at the annual meeting in February:

President: E. R. Needles of Howard, Needles, Tammen & Bergendoff, Consulting Engineers, New York, N.Y.

Vice Presidents: Paul B. Reinhold, president, Atlas Equipment Co., Pittsburgh; Charles W. Smith, president, Smith Engineering & Construction Co., Pensacola; W. A. Roberts, executive vice president, Allis-Chalmers Mfg. Co., Milwaukee; Thos. E. Stanton, materials and research engineer, California Division of Highways, Sacramento.

Treasurer: Jennings Randolph,, assistant to president, Capital Airlines, Inc., Washington, D.C.

Directors (term ending 1953): James C. Alban, president, Alban Tractor Co., Baltimore; James A. Anderson, commissioner, Virginia Department of Highways, Richmond; Jos. D. Bonness, president, Jos. D. Bonness, Inc., Milwaukee; J. F. Cast, Sales Dept., Firestone Tire & Rubber Co., Cleveland; H. G. Sours, Baldwin & Sours, Columbus; Gail E. Spain, vice president, Caterpillar Tractor Co., Peoria, Ill.; Charles M. Upham, engineer-director, American Road Builders' Association, Washington, D. C.



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As wheel load approaches closed crack in reinforced pavement, aggregate interlock renders the crack-joint shear resistant, and both slab ends, instead of one, carry the load.

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Great stretches of heavily-traveled American highways are assured long life and low upkeep by Truscon Welded Wire Fabric and other Truscon Steel Reinforcing Products. The engineers and designers on these projects have found by experience, practice and research that Truscon Welded Wire Fabric offers these advantages:

- **Provides resistance to cracking due to shrinkage of concrete during setting period.**
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- **Provides resistance to broken ends of slabs separating at a crack.**
- **Decreases spalling and progressive disintegration of the concrete.**

Use Truscon Welded Wire Fabric with other associated Truscon roadbuilding products, and assure lasting prestige for you and more permanent highways for the communities you serve.

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Subsidiary of Republic Steel Corporation

TRUSCON WELDED WIRE FABRIC

Covers the Continent

$810,000,000 Yearly Federal Aid Recommended by AASHO Leaders

AN increase in federal-aid for highway construction will be recommended to Congressional leaders in 1950, as a result of a special executive session of top leaders in the American Association of State Highway Officials. Meeting at the Edgewater Beach Hotel in Chicago, Nov. 21-22, this group of 52 leaders, representing all states, adopted a statement of national policy outlined as follows, in regard to the Association's recommendation for new federal-aid legislation to extend the Federal Aid Highway Act of 1948 now in force.

The present federal authorization of $450 million annually would be increased to $810 million, not including forest and national park roads. This sum to be divided:

$210 million yearly for the Interstate Highway System—a new category of funds.

$270 million yearly for primary federal-aid roads.

$180 million yearly for secondary federal-aid roads.

$150 million yearly for urban highways.

The $210 million for the Interstate Highway System would be supplied to the states on a 75-25 matching basis, apportionment between the states being on a basis of population except that no single state would receive less than ¾ of one percent of the total.

A far-reaching recommendation with respect to this new class of funds is that any state be permitted to issue general obligation bonds for its share of the cost of toll-free facilities on the Interstate System. Annual aid allotments could be applied to retire the principal of such bonds, this expediency being suggested for states desiring to speed up the construction of needed highways.

Primary secondary and urban federal-aid road funds would continue to be apportioned to the states on the time-honored 50-50 basis, under the present formula based on road mileage, population and area.

Meetings Ahead

Associated Equipment Distributors: 31st annual meeting, Stevens Hotel, Chicago; January 15-19.

Associated General Contractors of America, Inc.; annual meeting, San Francisco; Feb. 27-March 2.

American Road Builders' Ass'n.; 47th annual meeting, Cincinnati, Ohio; March 6-9.

Third Highway Transportation Congress, sponsored by National Highway Users Conference, Mayflower Hotel, Washington, D. C., April 26-27.

A New Twist on Our Public Relations Job

To provide a highway system commensurate with needs accentuated by war-time deterioration and neglect of roads and streets, the highway industry and profession must take its story to the people, the American Road Builders' Association was told at its Fall Conference.

"Follow the methods long used by politicians and private enterprise," John W. Darr, President, Institute of Public Relations, counselled, that "only a direct 'selling' job of molding and guiding public opinion can arouse the public to foot the multi-billion-dollar bill to provide a transportation system composed of both vehicle and roadway adequate to the needs of the day."

This speaker cited the increase of 13,000,000 motor vehicles since war's end, noting that highway transportation "penetrates deeply into the whole fabric of our social, economic, and military life. . . . The considerations involved go much deeper than the matter of joy-riding. As a Brookings Institution report recently pointed out, automotive transportation is the end product of America's greatest combination of economic activities. In this $30 billion a year endeavor, which is a partnership between private enterprise on the one hand and government, or the people, on the other, the people can be sold, for they have an enormous stake in saving their investment in transportation."

The conference learned of 1950 Congressional legislative proposals for federal highway aid totaling well over a billion dollars, a record sum even in the midst of all our multi-billion-dollar budgets. These requests will be divided as follows: $450,000,000 of regular federal-aid; a like or greater amount for defense highways; and likely as much as $150,000,000 for so-called local roads—routes ranking below primary or secondary roads for which federal-aid is furnished at present.

Speaking of the 30-million-vehicle Labor Day jam of 1949, and the 40% increase in vehicle registration, Mr. Darr wonders what will happen on such peak days, say, four years from now, if this growth continues. On the other hand, if the increase in motor vehicle registration drops materially, serious consequences are bound to result in our national economy. Can we expect to keep on breaking production records in the manufacture of automobiles without any place to use them?

"These are problems of which the public must be made aware, and no greater job faces the highway industry and profession. Unless the public is alerted to the benefits of investing in an adequate highway system and to the dangers and waste lurking in our present inadequate system, America's road builders cannot hope to proceed with the program of improvements, necessary though that program may be," said Mr. Darr.

(*Continued from page* 22)

profit incentive," he added.

"Labor is keenly interested in and directly affected by inequalities resulting from expenditures of some 90% of automotive costs on the vehicle, its fuel, upkeep, insurance, etc., and only 10% or less on the construction and maintenance of the highways on which the vehicles operate," further noted the labor leader. "We are fully aware of the advantages which our highways offer, socially, culturally, economically, and we are appreciative, just as all Americans should be."

Day labor utilized in national road-building projects was designated a part of the whole pattern of socialism in this country by Dr. George C. Smith, research economist of the Chamber of Commerce of the United States. He warned that the country's "descent into socialism" would not be accomplished by a clear-cut vote on the issue but by the piecemeal adoption of legislation giving greater controls to the Government.

Announcing: THE NEW JACKSON ELECTRIC

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FLEXIBLE-SHAFT CONCRETE VIBRATOR

WITH EVERYTHING the GENERAL CONTRACTOR COULD WANT

POWER GALORE: 2½ HP (continuous duty rating) Universal Motor provides more than ample power for uninterrupted placing of the stiffest mixes using the maximum length of shaft.

LIGHT SOCKET OPERATION: Wherever either 115 volt, 60 cycle single phase AC or Direct Current is available this relatively inexpensive vibrator will do a bang-up job of concrete placement.

HIGH FREQUENCY — 3 VIBRATOR HEADS: 8,000 to 10,000 VPM and availability of three vibrator heads assure rapid as well as thorough consolidation of the stiffest mix concrete under all conditions.

28 FOOT REACH: Available with any length of shaft up to 28 feet. Maximum length makes hard-to-get-to places readily accessible — saves time by making frequent changes of vibrator location.

CONVENIENT - RUGGED CONSTRUCTION: Double grip, skid-base handle with finger tip control switch. Weighs only 50 lbs. Finest, smooth-running flexible shaft and fittings — built to take the most severe usage.

GRINDING: Countershaft attachment for quick conversion to wet or dry concrete rubbing.

See this outstanding general-purpose electric vibrator at your Jackson Distributor or write for complete facts.

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your free copy of the Jackson "POCKET GUIDE" to the best vibratory equipment for every type of concrete placement — Soil Compaction — Portable Power Plants.

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★ New operating data on scrapers presented in accompanying article should aid engineers as well as contractors in evaluating the problems of equipment utilization as they affect bid prices

Scraper Production

Job Data Summarized by Research Committee Reports

Report No. 11—Subject: utilization of available working time of rubber tired tractor-drawn scraper units on highway grading projects in the Southern states

STUDIES conducted during the past 16 months on active rural highway grading projects reveal that 72% of the total available working time of rubber tired tractor-drawn scraper units is lost in delays. These studies were conducted by the Production Cost Unit of the Bureau of Public Roads. The data represent a composite summary of a variety of job conditions and management practices. No endeavor has been made to present selected data for purposes of enabling comparisons of performance to be made with other types or classes of equipment.

The studies cover operations of 19 scraper units during 2,660 hours of total available working time on six jobs in three southern states. The scrapers ranged from 8 to 13 cu. yd. struck capacity and were pulled by 2- and 4-wheel rubber tired tractors ranging in size from 110 to 135 drawbar hp. Pushers were used with the units on all six projects.

The accompanying "time distribution" table shows the distribution of the combined total available working time for the 19 scraper units.

Time Distribution

Distribution of 2,660 hours total available working time rubber tired tractor-drawn scraper units

Time element	Percentage of total available working time	
	Range	Average
Total available working time	100	100
Major delays	28-85	65
Net available working time	15-72	35
Minor delays	3-12	7
Actual productive time	12-61	28

In this table the total available working time is the sum of normal daily shift time plus such occasional overtime as actually worked; major delays are individual delays of 15 min. or more in duration; and minor delays are individual delays of less than 15 min. in duration.

The extent of major delays of 15 min. or more in duration due to various causes is shown in table on this subject:

Causes of Major Delays

Classification of major delays to rubber tired tractor-drawn scraper units

Nature of major delay	Percentage of total available working time
Weather: rain, cold, wet grade	54
Open up cuts, trimming, etc.	4
Maintenance and repair of unit	3
Lack of operators	3
Other	1
Total	65

On some of the jobs studied, the rainfall was much greater than normal. This accounts for a large portion of the delay due to weather. It was also observed that wet grade was responsible for 60% of all major delays due to weather.

The classification of minor delays is shown in tabular form: Individual minor delays are ordinarily only a few seconds each in duration and constitute 7% of the total available working time as shown in the "Time Distribution" table. However, their full extent can usually be better visualized by comparing them to the net available working time. For example, when minor delays are expressed as a percentage of the total available working time, a job having frequent and extensive major delays, such as bad weather, tends to show a lesser percentage of minor delays than a job having a few major delays. Thus, a better basis for indicating the extent of minor de-

Committee reports Nos. 11, 12 and 13, committee on economics of highway construction and maintenance methods under the Highway Research Board's department of economics, finance and administration

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Easier plowing, of course, means faster snow removal. It means that your roads and streets are kept open for winter traffic at all times.

One of the many features of the Frink V-Type Sno-Plow is its ability to remove snow faster. This is because the cutting edge and the front of the moldboard are built to keep the snow moving at all times, yet there is no side-thrust on the Frink.

EXCLUSIVE FRINK FEATURES

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2. Full selective power hydraulic control permits easier, faster handling.
3. Reversible cutting edges give double wear for greater economy.
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lays in relation to the production operation is to express them as a percentage of the net available working time.

Minor delays constitute almost one-fifth of the net available working time for the six jobs combined and varied on individual projects from 16 to 26%.

Causes of Minor Delays

Classification of minor delays to rubber tired tractor-drawn scraper units

Nature of minor delay	Percentage of net available working time
Awaiting pusher	12
Maintenance and repair of unit	2
Maintaining haul road	1
Personal	1
Contractor's traffic	1
Other	2
Total	19

Report No. 12—Subject: operating cycle of crawler-tractor-drawn scraper units on highway grading operations in the Eastern and Southern states

Equipment production studies made during the past two years on crawler-tractor-drawn scraper units, working on active rural highway grading jobs, show that the total time each scraper unit spends in loading, dumping, and turning averages 2.85 min. each round trip. The average travel speed while hauling and returning was approximately 335 ft. per min. These studies were conducted by the Production Cost Unit of the Bureau of Public Roads, and the data presented in this report represent a composite summary of observations made under a variety of job conditions and management practices. No endeavor has been made to present selected data for purposes of enabling comparisons of performance to be made with other types or classes of equipment under identical operating conditions.

Forty-one units working on 11 different projects were observed for a total of 3,900 hours of total available working time during which approximately 22,000 loads of material were moved. The scrapers ranged in size from 8 to 19 cu. yd. struck capacity and were pulled by tractors having 70 to 150 drawbar hp.

Tabulated here is a composite summary for all jobs of the data relating to the scraper cycle elements and the pay yardage per scraper load.

Pusher tractors were used to assist in the loading operation in about 60% of the cases throughout the period of observation. All delays have been excluded from the time constant elements (items 1, 2, 3, and 4) listed in above table. Haul distance, item 5, is the longitudinal distance traveled from the point the scraper gate is closed after the load is obtained to the point where the scraper gate is opened to discharge the load.

Crawler Scraper Cycle Time

Summary of average round-trip cycle data for 8 to 19 cu. yd. crawler-tractor-drawn scraper units on rural highway grading jobs

Element	Range	Average
1. Load	1.1-2.9 min.	1.68 min.
2. Dump and turn at fill	0.4-1.3 min.	.75 min.
3. Turn in cut	0.3-0.7 min.	.42 min.
4. Total time constant (sum of items 1, 2, and 3)	1.9-4.2 min.	2.85 min.
5. Haul distance	130-1,300 ft.	536 ft.
6. Haul speed, loaded	165-470 ft./min.	322 ft./min.
7. Return speed empty	230-480 ft./min.	345 ft./min.
8. Pay yardage per load	56-106% of struck capacity of scraper	79% of struck capacity of scraper

The cycle data were obtained by timing several thousand individual round trips. The average pay yardage per scraper load was computed on each job from load counts and the corresponding cubic yards of excavation obtained from cross sections. Character of excavation varied on each job as well as between jobs from "easy digging" in comparatively light material to "hard digging" in blasted shale rock.

The ranges in the table are job averages. On several of the projects the variations from day to day frequently exceeded the ranges shown. For example, the loading time on a particular job may have varied from 0.7 to 3.1 min., but only the over-all job average was considered when listing the entries in the above table.

Small vs. Large Units

In general, the smaller scrapers were observed to have a slightly smaller time constant, and slightly higher haul and return speeds than the larger units. Also, for the units studied, a slightly larger pay load in relation to the size of the unit was obtained by the smaller units.

The use of pushers materially improved the performance of the large scraper units by decreasing the loading time and loading distance, and by increasing the pay load. For the smaller scraper units, the pushers reduced the loading time and loading distance, but did not materially affect the pay load. These observations are made solely on the basis of the observed field conditions. No studies have thus far been made for the purpose of comparing performance with and without pusher assistance under otherwise identical operating conditions.

Future reports on these and other factors affecting scraper performance, such as size and type of unit, kind of material, grades, ground conditions, operator efficiency, and so on, will be issued at such time as a sufficient number of studies have been made to afford more positive indication of the extent of these variations.

Report No. 13—Subject: operating cycle of rubber tired tractor-drawn scraper units on highway grading operations in the eastern and southern states

Equipment production studies during past two years on rubber tired tractor-drawn scraper units working on active rural highway grading jobs show that the total time each scraper unit spends in loading, dumping, and turning averages 2.2 minutes each round trip. The average travel speed while hauling and returning was approximately 695 ft. per min. The data presented in this report represent a composite summary of the observations made under a variety of job conditions and management practices. No endeavor has been made to present selected data for purposes of enabling comparisons of performance to be made with other types or classes of equipment under identical operating conditions.

Nineteen units working on 6 different projects were observed for a total of 2,660 hours of total available working time, during which time approximately 9,200 loads of material were moved. The scrapers ranged in size from 8 to 13 cu. yd. struck capacity and were pulled by 2- and 4-wheel rubber tired tractors having 110 to 135 hp. (drawbar).

Tabulated here is a composite sum-

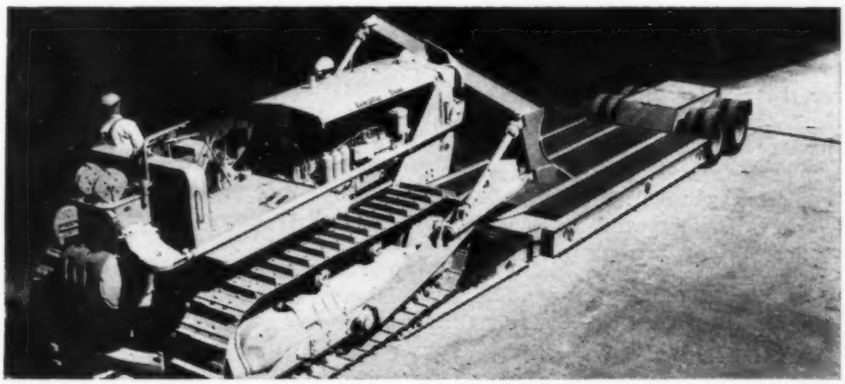
Cycles Using Rubber Tired Tractors

Average round trip cycle data, rubber tired tractor-drawn scraper units

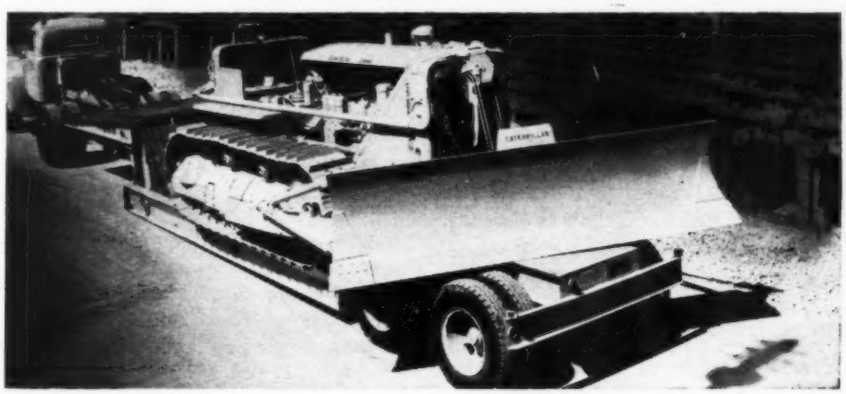
Element	Range	Average
1. Load	0.9-2.2 min.	1.36 min.
2. Dump and turn at fill	0.4-0.7 min.	0.56 min.
3. Turn in cut	0.2-0.4 min.	0.31 min.
4. Total time constant (sum of items 1, 2, and 3)	1.8-3.3 min.	2.23 min.
5. Haul distance	420-1,890 ft.	873 ft.
6. Haul speed, loaded	465-1,100 ft./min.	676 ft./min.
7. Return speed, empty	370-1,200 ft./min.	714 ft./min.
8. Pay yardage per load	68-94% of struck capacity of scraper	84 % of struck capacity of scraper

NEW EQUIPMENT

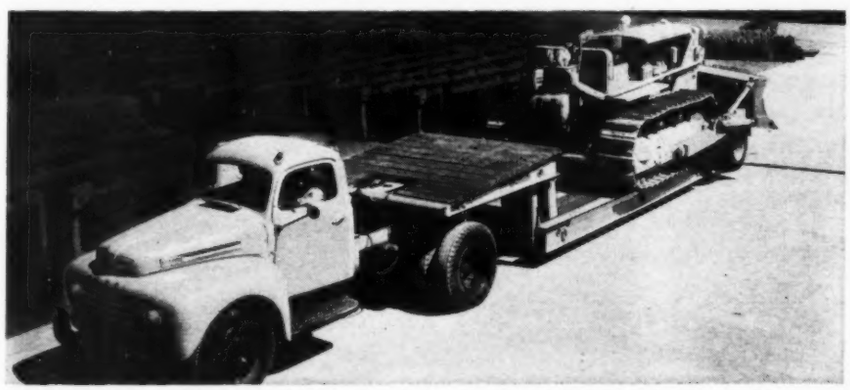
The Martin Machine Company, Kewanee, Illinois, has introduced a new trailer featuring a patented Folding Gooseneck which, when lowered to the ground, forms a loading ramp. The new trailer, in capacities up to 100-tons, eliminates cumbersome loading ramps and cribbing, reduces idle man and equipment hours. Loading can be accomplished by one man in a fraction of the time formerly required by several men. Low platform height, accomplished by front loading, provides greater clearance for viaducts, bridges and wires, assuring fast, safe movement between jobs. Like other Martin "Carryhaul" trailers, the new Folding Gooseneck will be sold exclusively through "Caterpillar" dealers. The sequence photos below show actual operation of the new Martin Folding Gooseneck.



Folding Gooseneck lowered to form ramp for loading D-8 "Caterpillar". Loading ramps and cribbing are eliminated. One man loads.



Folding Gooseneck being raised to towing position. Loading is easily accomplished in 5 minutes.



Ready to roll. Note low platform height which provides maximum clearance for viaducts, wires, bridges — greater safety.

mary for all jobs of the data relating to the scraper cycle elements and the pay yardage per scraper load.

Pusher or pull (snatch) tractors were used to assist in the loading operation in more than 98% of the cases throughout the period of observation. All delays have been excluded from the time constant elements (items 1, 2, 3, and 4) listed in the table. The haul distance, item 5, is the longitudinal distance traveled from the point the scraper gate is closed after the load is obtained to the point where the scraper gate is opened to discharge the load.

The cycle data were obtained by timing several thousand individual round trips. Average pay yardage per scraper load was computed on each job from load counts and the corresponding cubic yards of excavation obtained from cross sections. The character of excavation varied on each job as well as between jobs from "easy digging" in loose, light, bulky materials to "hard digging" in compacted clay or rocky materials.

The ranges in the tabulation are job averages. On several of the projects the variations from day to day frequently exceeded the ranges which are shown. For example, the loading time on a particular job may have varied from 0.4 to 2.8 min., but only the over-all job average was considered when listing the entries.

Sufficient studies have not yet been made to warrant analyses of the individual effect upon scraper cycle elements and pay yardage per scraper load of such factors as individual size and type of unit, kind of material, grades, ground conditions, operator efficiency, and so on.

Certain general observations of performance on the various jobs are of interest, however. As might be expected, the smaller units showed a slight advantage over the larger units with respect to the extent of the time constant. Also, for the units studied, a slightly larger pay load in relation to the size of the unit was obtained for the smaller units. On the other hand, the haul and return speeds for the larger units were somewhat faster. The variations among these factors for various sizes of units were within rather narrow ranges. Future reports on these matters will be issued at such time as a sufficient number of studies are made to afford more positive indication of the extent of these variations.

Public Roads Has Job Openings

Examinations have been announced by the U. S. Civil Service Commission for Highway Engineer Trainee, Highway Engineer, and Highway Bridge Engineer. These positions which pay from $2,650 to $3,825 a year, are mainly in the Bureau of Public Roads of the Department of Commerce in Washington, D. C., and throughout the country. A few positions may also be filled outside the United States.

To qualify for highway engineer trainee positions paying $2,650 to $3,100 a year, applicants must pass a written test and, in addition, must have had college study in civil engineering. For the $3,100 positions, appropriate engineering experience may be substituted for the required college study. Applicants for highway engineer or highway bridge engineer positions, which pay $3,825 a year, must, in addition to passing a written test, have had one year of professional highway or highway bridge engineering experience or have completed the requirements for the master's degree in engineering. Applications will be accepted from students who expect to complete the required courses not later than June 30, 1950.

Further information and application forms may be obtained from most first- and second-class post offices, from civil service regional offices, or from the U. S. Civil Service Commission, Washington 25, D. C. Applications must be received in the Commission's Washington office not later than February 8, 1950.

●

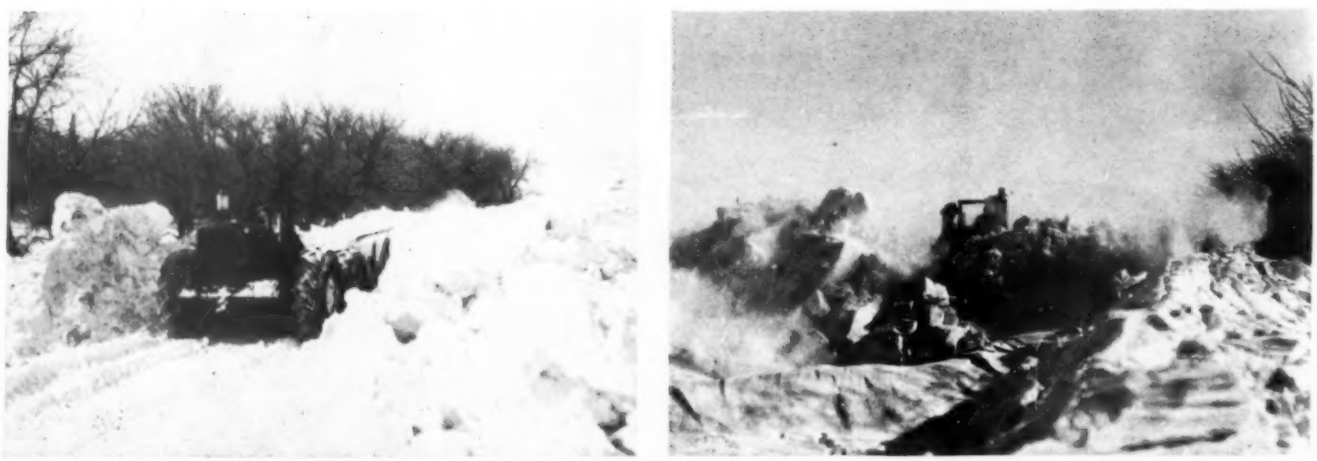
Ninety-eight Maine cities and towns now have nonpolitical municipal managers—more than any other state in the nation. The trend toward city manager rule has been growing steadily for 31 years, and today nearly 50% of Maine's inhabitants live in communities so administered.

Rubber Tired Dozer Snow Plow Proves Effective

SINCE being introduced late in 1948, the "V" type snow plow, mounted on the rubber-tired Tournadozer, has proved itself to be one answer to the snow removal problem.

When last winter's 27-inch snow and blizzard hit the Midwest, Frank Halverson, contractor at Bonesteel, S. D., equipped his dozer with a LeTourneau snow plow. He dug out farm yards, freed marooned cattle in Gregory county, and helped clear snow-blocked county roads and streets that had been closed more than two weeks.

During one 10-day period of operation, Halverson's outfit alone cleared over 300 miles of county highways, and 150 miles of township roads. That's an overall average of 45 miles a day through deep, frozen drifts up to 14 feet.



★ Left: Clearing snow-blocked road in Gregory county, South Dakota. Right; Tournadozer snow plow clears path in S.D.

CUTTING DRAINAGE COSTS IS LIKE PLAYING GOLF

"Matched Clubs" mean better results for the golfer. In drainage, your "matched set" of ARMCO Corrugated Metal Structures means you get exactly the right structure to do the job. Here's how it works to save you time, money and labor.

You choose plain, Galvanized ARMCO Corrugated Metal Pipe for normal service, ASBESTOS-BONDED Pipe to check severe corrosion, or PAVED-INVERT Pipe whenever erosion is the problem.

For large structures, such as stream enclosures or small bridges, there is ARMCO MULTI-PLATE Pipe or Arches. These are shipped to the site "knocked down" ready for quick, easy field assembly. If headroom is limited, either a plain corrugated PIPE-ARCH or MULTI-PLATE PIPE-ARCH will save raising the grade or installing costly multiple openings.

You'll find that all ARMCO Structures are easy to install with just a small, unskilled crew doing the work. There is no need for special tools or heavy equipment. The completed structure will provide years of durable service with little or no maintenance. Write today for complete information and be ready for that next job. Armco Drainage & Metal Products, Inc., 845 Curtis St., Middletown, Ohio.

ARMCO

ARMCO DRAINAGE STRUCTURES

★ The rail puller consists of a pair of skids or runners, supporting a platform on which power-actuated lifting tongs are mounted. Note pockets cut in pavement where tongs are to be set

Hydraulic Rail Puller

Uproots 1,000 ft. of Street Railway Track Daily in Chicago

By Horace L. Howell

Superintendent of Way and Structures, Chicago Transit Authority

THE Chicago Transit Authority recently put into operation a machine for pulling rails on streets where street railway operation was discontinued and paving improvements are being conducted by the City of Chicago.

The City's street program required an expeditious way of extracting rail from street pavement be provided in order to coordinate the work necessary to be done by C.T.A. in making possible immediate repaving of the street roadway.

The machine consists of a fabricated steel frame on which are mounted two 125-ton hydraulic jacks, provided with jaws at the lower end of the jack rams. These jaws are clamped around the rail head through openings which have been made at intervals in pavement to provide clearance for attaching the jaws to the rails. The jacks are hydraulically operated by means of a gasoline engine powering a Rodgers hydraulic pump for circulating the oil which is the medium for exerting power. The gasoline engine has a rating of approximately 31 hp. at 2,200 rpm. and drives the hydraulic pump which is capable of circulating 5 gals. of oil per minute, with a maximum pressure of 10,000 psi. The jacks can be operated selectively on either rail, or both jacks can be raised simultaneously. Each jack has a lifting ram travel of 18 in. The complete pulling operation is performed in about one minute.

Acme photo

★ Another view of the rail puller, showing how Wisconsin-motor-powered Rodgers hydraulic unit is mounted

How Puller Operates

The steel frame of the unit upon which the jacks are mounted is provided with two skids. When in working position the skids are located outside the rails with bearing points above the ends of the ties; when power is exerted through means of an operating valve, the upward motion of the jack rams will raise the rail and the resultant pressure exerted on the skids will hold the ties in place. The ballast surrounding the ties, in most cases, is concrete, and it is left in place undisturbed.

The openings along the rail to admit fastening of the jaws are spaced according to the track condition. Where the track is solid and rigidly fastened by means of screw spikes, frequent openings are made, however, where fastenings on the rails have become loose and when the paving is not particularly good, openings are made less frequent.

The rail puller is drawn along the track by means of a truck and positioned over the openings for pulling the rail. The track itself after being hoisted 12 in. or more is stripped of paving, tie rods are cut, and the electrically welded rail flame-cut into lengths for hauling to the yard where it is sorted "re-usable" and scrap.

The rail puller weighs approximately 9,000 lbs., is 15 ft. long and 7 ft. high, thus permitting its use in confined places such as in tunnels or under viaducts. Experience with this machine has proven very satisfactory and has provided a means of removing rail much more expeditiously than by the older method of having to jack the rail out of position with hand jacks or hoisting the rail out of the street by means of a traveling crane to which is attached an "A" frame with tongs. When used continuously under average working conditions, on average track, this machine is capable of extracting in excess of 1,000 ft. of double track per 8-hour work-day.

★ Details of the lifting tongs. The iron strap is set in a position which locks the hooks during hoisting. (Right): Track fully raised and ready for the demolition crew

NEW MODELS...NEW VALUES !

See the new line of DODGE "Job-Rated" Trucks

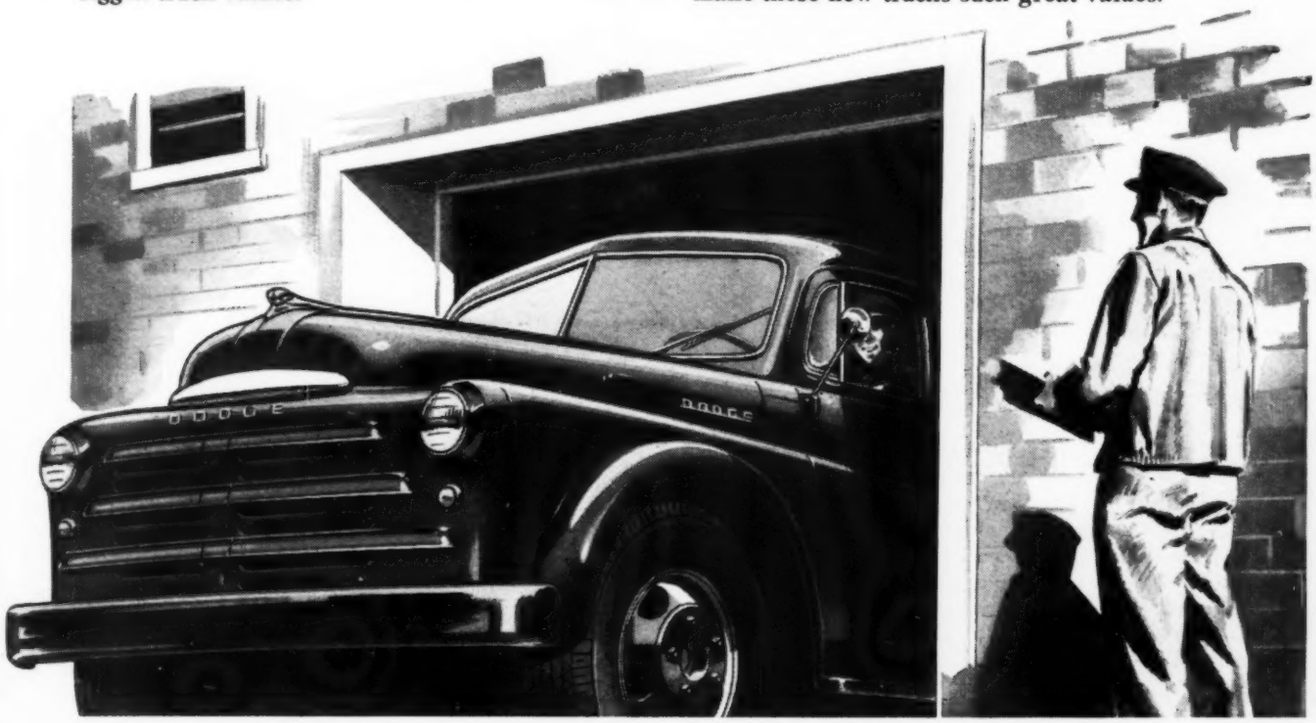
Compare Dodge low prices with competition

Be sure to see the new line of Dodge *"Job-Rated"* trucks.

Check the many new features and advantages of these new trucks . . . See *why* they are today's *biggest* truck values.

These new Dodge *"Job-Rated"* trucks are priced with the lowest. But remember! It's what you *get* for what you *pay* that counts.

Listed below are just a few of the features that make these new trucks such great values.



1. **New Synchro-Shift** 3-, 4- or 5-speed transmissions—*"Job-Rated"* for the load. Smooth, silent, easy to shift. Get behind the wheel . . . feel the difference.

2. **New Steering Column Gearshift** on ½-, ¾-, and 1-ton models. Gives you real handling ease. Safe, fast, flexible operation.

3. **Short Turning Diameters:** As low as 38 feet for right or left turns. Compare this great advantage with competition.

4. **Top Performance with Economy:** Each truck is powered with a *"Job-Rated"* truck engine. Your power matches your load. Compare Dodge with competition on this important point.

5. **Cyclebonded Brake Linings** (no rivets): Brake linings last longer. No scored brake drums.

6. **New Splash- and Dust-proof Electrical Systems:** All parts and connections positively protected. Extra high output generators and coil; resistor-type spark plugs. Amazingly smooth operation—even at low engine speed.

7. **"Pilot-House" Cabs:** Rear-quarter windows and big 890 sq. in. windshield give safe all-'round vision. Vent wings provide controlled ventilation. You ride in deep-cushioned comfort on a big 57¼-inch seat.

* * * *

See your Dodge dealer *now*. Let him show *ALL* the new Dodge advantages . . . and why Dodge *"Job-Rated"* trucks will give you lowest *operating* costs.

He'll give you a good deal on any one of more than 350 Dodge chassis and body models.

Low down payments. Low monthly payments. Liberal allowance for your used truck.

For the good of your business...

Switch to DODGE "Job-Rated" TRUCKS

★ General view of a typical installation. Storage pile and equipment in the background

"Super Multi" Pipe Culverts

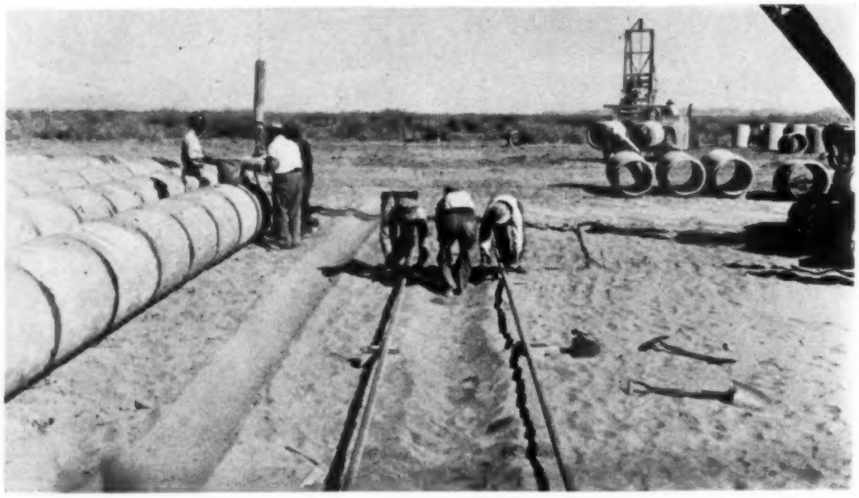
Placed by Assembly Line Methods

By Lindsay F. Root

Assistant Administration Engineer,
New Mexico State Highway Department,
Santa Fe

MULTIPLE-PIPE culverts having three or four lines of pipe are not an uncommon design solution for wide, shallow waterways. But a culvert with 183 rows of pipe would seem to set a record. Such a culvert was placed recently across a dry wash in southern New Mexico as part of an improvement project on U.S. 70-80. Sixteen such out-of-the-ordinary culverts were placed, containing, respectively, 43, 26, 21, 17 and 10 lines of 30-in.-diam. concrete pipe placed on 5-ft. centers.

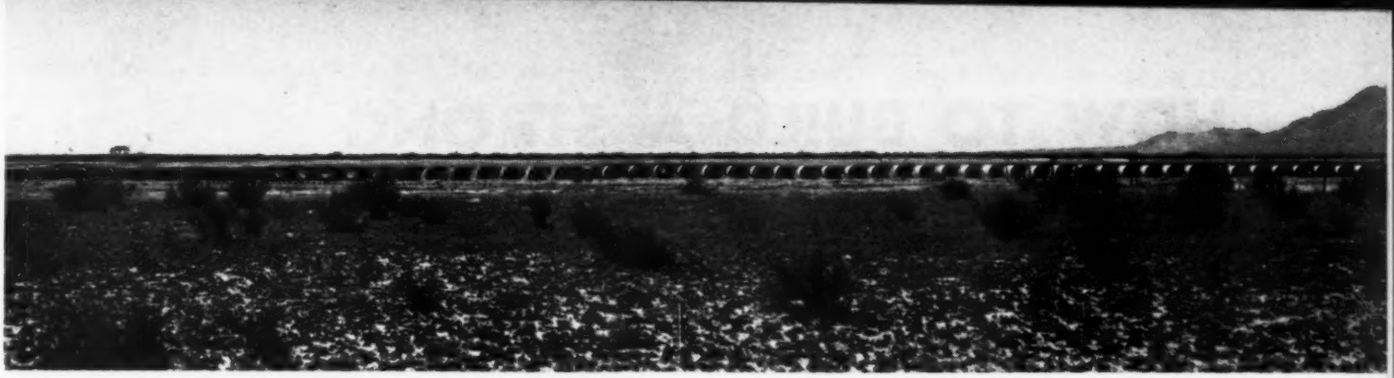
The site of these unusual structures is in a semi-arid locality between Las Cruces and Deming. The roadway had



★ Template crew starting a new trench. Completed trench ready for the pipe on the left

★ Pipe ready to be dropped into place by the crane operator

★ Pipe crew start a new row; 18 rows were laid every day



★ Completed installation of 69 pipes at another point on the project

★ Surveying crews spot "blue tops" for placing of template

long suffered from the effects of torrential flash floods following heavy rains in the surrounding hills. When a rain hits, water runs off in a hurry into the low, flat spots. The ground absorbs very little. Drainage structures to be adequate need to afford drainage outlet over a considerable width with very low headroom, hence the solution to install pipe in as many lines as are needed. Concrete pipe was estimated to be more economical than concrete boxes for the locations involved.

Over 1,000 Ft. Daily

The contractor, W. T. Bookout of Las Vegas, developed assembly line methods for this so-called "mud-whistle" project which enabled his crew to lay 30-in.-diameter pipe at the rate of 1,152 lin. ft. per day. A total of 43,904 lin. ft. of 30-in. pipe was delivered by the Teller Concrete Pipe Co., from El Paso, 87 miles away, pipe being hauled to the job by trailer carrying twenty-four 4-ft. sections per load.

At the project the pipe was unloaded two lengths at a time using a loader (Scoopmobile), this machine stockpiling and later transferring pipe to positions adjacent to the installation.

The site was blanketed over with 12 in. depth of sand, and levelmen set blue-top stakes giving the exact elevation of inlet and outlet of each pipe. A template designed to trench into the sand and form a bed for the pipe was built, this template being supported on two parallel iron pipe runners which in turn rested on the blue-tops for exact height. (See photo.) The trench or bed so formed was 6 in. deep and enabled the contractor to meet the specification requiring that a minimum of 10% of the pipe surface be in contact with the bedding sand, with at least 6 in. of sand under the pipe. (Heretofore on such projects the state has required that pipe be bedded by tamping earth under the pipe after placement.)

The assembly-line methods began with the template crew. This 3-man crew worked about two trenches ahead of the pipe laying crew.

The pipe crew employed a crawler crane and the customary U-hook. The procedure was to raise a pipe section slightly off the ground, moisten its spigot end, apply mortar around the top of the spigot end, swing the pipe into position, and shove it tight into the bell end of the previously laid pipe, which had been mortared except at the top side.

The outside of the joint was then mortared and the crew moved on to the next pipe section as it was swung into place. The pipe crew developed such proficiency that it was able usually to place eighteen rows per day of pipe or 288 pipe sections.

With the relatively shallow sand cradle and the 5-ft. spacing between centers, the pipe required careful backfilling. The backfilling crew worked about a week behind the pipe crew, giving the mortar joints time to develop strength. Backfill dirt was placed and hand-tamped in 12-in. layers, care being taken to prevent backfilling from progressing more than 12 in. higher on one side of any pipeline than on the other. Due to the shallow fill depth over the pipe, thorough backfilling was required to minimize the possibilty of "corduroying" in the finisher road.

U.S. 40 Four Lanes Across Indiana

Indiana has largely completed 4-lane construction on remaining portions of U.S. 40 within its boundaries, thus becoming the first middle western state to have a multi-lane highway continuously crossing the entire state.

★ 103 lines of concrete pipe in place, with 80 more lines to go. Present US 70-80 roadway can be seen at left

HOW TO BUILD A STRONG

Good Roads Association

No. 1 of a Series—IOWA

Editor's Note: Roads and Streets is inaugurating a series of articles on highway associations, in the belief that only through more effective state-wide mobilization of citizens can we hope to accelerate highway construction to meet deficiencies. Mr. Coykendall, author of this article, fulfills two of the prime requisites of a road association leader, in that he knows his state's highway needs intimately and is held in high esteem on his long record as an administrative engineer with the Iowa Highway Commission.

By Claud Coykendall

Executive Secretary, Iowa Good Roads Association, Inc., Des Moines, Iowa

IN his recent editorial, Col. Brown of the ROADS AND STREETS staff is right in stating that there is need for more active and effective Good Roads Associations. [See Oct. '49 issue] Such associations are needed today more than ever, in order that the public may be made more fully awake to the need for a greatly expanded highway program.

Certainly the need seems to be nation-wide, and the public to date has not taken effective steps to meet this need. New action is required to convince the public that road and street facilities don't "just happen," and to mobilize the people to intelligent and constructive action.

Several Fundamentals

If a Good Roads Association is to be effective in promoting legislation providing for sound highway administration and adequate financing support for the several systems of roads and streets, it must:

1. Have leadership that is courageous, non-partisian, and completely nonpolitical.
2. Have experienced leadership that understands highway problems.
3. Be accepted by the public generally as an organization without any selfish interests to serve.
4. Concentrate its efforts on getting the public accurately informed on road and street problems. Legislators will support sound highway legislation, if the constituents want such legislation.
5. Avoid attempting to usurp the authority and responsibility of administrative agencies, such as state and local highway departments, in such matters as determination of priority of construction projects, engineering techniques, construction types, etc.
6. Be equally frank in commending sound administrative practices and in criticizing such practices when believed unsound.
7. Keep in mind that for the Public to do a good job of discharging its accepted responsibility of providing public roads and streets, three conditions, and *only three* are essential:
   a. Sound laws: Properly fixing responsibility for the several road and street systems; and, Prescribing practical and workable procedure for the duly designated administrative agencies.
   b. Adequate financial support for each of the several highway systems, equitably assessed against road users and road beneficiaries.
   c. Honest and efficient administration at national, state, and local levels.

A Good Roads Association should concentrate its efforts toward the creation of these three conditions.

Iowa Association's Purposes

Although organized only last winter, the Iowa Good Roads Association has already won wide recognition and support. Its first public statement was bannered "Purpose: better, safer roads for all Iowa," and its slogan: *"It costs more to use bad roads than to build good roads."*

More explicitly, the Association was formed as a non-profit organization *"for the sole purpose of promoting better and safer roads throughout the state; the Association is non-partisan and non-political and is dedicated to serve all Iowa and all Iowans rather than any particular area or group."*

The Association in its literature also emphasizes that its aim is to serve all Iowans—not any special interest or group or community. It is equally and impartially interested in all roads, whether they be primary or secondary, or roads and streets within municipalities.

The principal objective, also widely published, is described thus: *"To have Iowans fully and accurately informed on road and street matters. We have the utmost confidence that sound solutions will be found for our motor vehicle transportation problems, if these problems are recognized and understood. We hope that our booklets and bulletins will help to give the people of Iowa a better understanding of the over-all plan that has been developed on the state for financing, building and maintaining our roads and streets."*

Membership Requirements

The Association has four classes of membership:

1. Individual Memberships—available to any citizen of Iowa at an annual fee of $5.
2. Associate Memberships—available to organizations such as Commercial Clubs, Community Clubs, Farm Groups, Trade Associations, etc. The membership fee varies with the size and nature of the organization—annual minimum $10.
3. Sustaining Memberships—available to individuals, firms or corporations, not directly connected with highway work, but with an active interest in a sound, comprehensive, continuing highway program to the end that all roads and streets in Iowa may be improved and maintained in keeping with traffic needs.
4. Contributing Memberships—available to all individuals, firms or corporations directly connected with highway construction or maintenance work, or with the production or sale of materials, equipment, or supplies used in such work.

In all four classifications, the Association accepts memberships with

the definite understanding that the Association is promoting the cause of good roads for all—that the Association cannot and will not promote the special interest of any individual, group or organization.

Voting in the Association is limited to Individual and Associate Members. The business of the organization is conducted by a Board of Directors of 24—three from each of the eight Congressional Districts. The three directors from each Congressional District select one of their number to serve as a member of the Executive Committee.

Officers consist of President, Vice-President, and Secretary-Treasurer, chosen by the Executive Committee. The Executive Secretary is selected by the Board of Directors.

Working Philosophy

A widely publicized folder also stated:

"The Iowa Good Roads Association recognizes that the several governmental agencies in which we have vested the responsibility for building and maintaining the roads and streets can function only as they are permitted to function within the legal framework which we have created, acting through our chosen legislative representatives. State and Federal laws define the areas of responsibility, prescribe the methods of procedure which shall be followed, determine the amount of money that may be raised for highway work, and by whom this money shall be paid.

"The Association has no desire to interfere with the responsibilities allotted by law to the several governmental agencies. It does not suggest what roads shall be built, nor how.

"Iowa laws give County Supervisors the reponsibility for secondary road construction and maintenance work. For Primary roads, including their extensions within municipalities, this responsibility is vested in the Iowa State Highway Commission. For roads and streets within municipalities, the responsibility rests with town and city councils. The laws further provide for competent engineering and technical assistants to plan and supervise all highway construction and maintenance work.

Information Contained in New Booklet Issued

"With all these agencies, the Iowa Good Roads Association expects to cooperate in seeing that full information is available as a basis for sound judgment to determine priority of projects, to plan and construct highway facilities suited to traffic needs, and to get full value from road and street funds."

A new booklet entitled "Iowa's Roads and Streets" has been circulated widely through the extension service of the Iowa State College, and will be distributed to schools, study groups, clubs, etc.

This booklet reviews the highway situation in a straightforward manner, and reminds of the three fundamental steps in securing better roads: Sound laws, adequate financial support and efficient administration.

The booklet outlines the state's road laws in simple language, and also summarizes the state's present road financial picture. It closes with a further utterance believed to be of great importance:

Who is Responsible?

"The responsibility for honest, efficient administration of the roads and streets of Iowa rests squarely with the voters. They elect the Governor, who appoints the members of the State Highway Commission. They elect the state senators, who confirm these appointments. They elect the Boards of Supervisors and the town and city Councils. Presumably we get the kind of administration of our roads and streets that a majority of us want, for by majority vote we select our administrators.

"In the past, we have apparently voted wisely for through the years the road and street programs of the state have been well administered. The relatively few instances of dishonest or inefficient administration that can be cited are the exceptions that prove the rule.

"At times we have been unfairly critical of our public officials. We have blamed them for failing to do what it was not possible for them to do under existing laws and with the funds that we have placed at their disposal. We have valiantly endeavored to build a system of roads and streets with "some" money and "lots" of political pressure. The action of the 53rd General Assembly in providing substantially more financial support for all of our systems of roads and streets than they have heretofore been given, is encouraging evidence of a more realistic approach to a solution of our road and street problems."

Association's Activity

In addition to a program of speaking engagements before civic clubs and other groups, and of literature distribution, the Association has several planned activities.

One, of course, is membership soliciti-

(*Continued on page* 62)

Iowa Has Made Good Legislative Progress

More sound comprehensive highway legislation was enacted by the 53rd General Assembly of the State of Iowa, which adjourned last April, than had ever been enacted at a single legislative session in the State's history. Legislators followed very closely the recommendations submitted by the Highway Study Committee that had been created by the 52nd General Assembly.

Among the more important laws passed were:

1. A state "Road Use Tax Fund" was created, into which all net receipts from special taxes on motor vehicle transportation are placed, and then distributed among the several road systems of the state on a percentage basis.

2. Annual road building revenues were increased by about $14,200,000, approximately $6,000,000 of which resulted from graduated increases in motor vehicle registration fees, and $8,200,000 from diverting retail sales tax and use tax collections on motor vehicles, tires, parts, and accessories from the State General Fund to the road use tax fund.

3. Five million dollars were transferred from the State General fund to the Primary road fund, to make possible an expanded Primary road construction program in 1949, before the effect of other increases, authorized in road income, could be felt.

4. The $17,000,000 ceiling on primary road income that had restricted Primary road developments for the past decade was removed.

5. The State Highway Commission was authorized to set aside up to 1½% of the Farm-to-Market road fund to finance research projects particularly pertinent to secondary road construction and maintenance work.

6. Procedural laws pertaining to the administration of both Primary roads and Secondary roads were improved.

7. An Interim Legislative Committee was created to study Municipal Statutes, and to submit its recommendations for simplifying, improving and clarifying such laws to the next session of the General Assembly for consideration.

California Highway Engineers Develop Own Power

Soil Sampler

Heavy-duty truck-mounted unit undergoing tryout; takes representative sample for each soil layer without inter-mixing

★ Power auger in operating position

By A. W. Root

Senior Physical Testing Engineer, California Division of Highways, Sacramento

THE Materials and Research Department of the California Division of Highways has for several years recognized the need for power equipment in each of the eleven highway districts, for use in obtaining large disturbed samples of material in borrow sites and roadway cuts. Several different types of power boring machines had been used and others were inspected and studied, but it was felt that none of the machines then on the market fully met our needs for a light, highly mobile, reasonably priced machine capable of boring holes to depths of 50 ft. or more, and permitting sampling from each soil layer. Therefore, the equipment department was asked to design and build such a boring machine. Construction of the rig was started in 1947, but difficulty in obtaining parts, pressure of work in the shop, and numerous modifications in design during the construction of the machine contributed to delays in completion, so that the rig was not ready for actual field use until early in 1949.

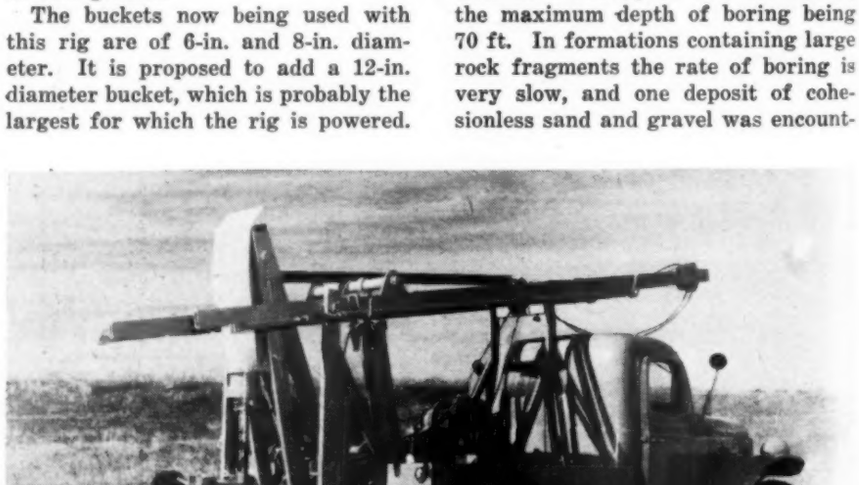
Auger Details

Following is a description of the power auger as finally constructed. The auger is permanently mounted on a 4 x 4 one-ton truck, with a power take-off supplying all power for operation of the auger. The rotary table, inside diameter 15 in., is driven through a 4-speed transmission and clutch. An oil pump provides hydraulic pressure for operation of the hydraulic ram which raises the mast, and also a large ram which applies the feed pressure to the driving Kelly. This hydraulic cylinder can also be used for pulling in case the auger becomes stuck and then cannot be lifted with the hoist. A double-drum hoist provides two hoist lines, a slow speed for heavy pulling, and a high speed line for rapid hoisting. The rotary table drives a 6-ft.-long, square Kelly; drill rods are 2½ in. diameter in 5-ft. lengths with quick couplings. The steel mast of 14 ft. over-all height is raised hydraulically; in traveling position it folds down over the cab.

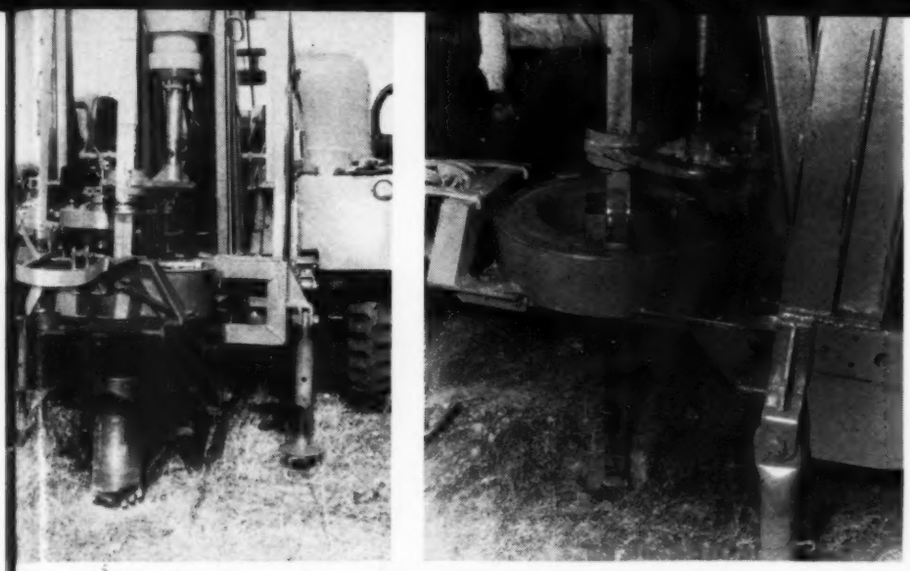
A two-wheel trailer is provided with the drill rig for hauling extra tools, drill rods, samples and supplies. The truck is equipped with a front end winch which can be used to assist in pulling the truck over steep terrain or soft ground.

The buckets now being used with this rig are of 6-in. and 8-in. diameter. It is proposed to add a 12-in. diameter bucket, which is probably the largest for which the rig is powered. It has been found that various types of cutting bits are required, no one type being efficient in all types of soil. All of the buckets have side-opening doors for quick dumping. Three types of cutters are being used: one bucket having replaceable cutting teeth of the "scarifier" type is used for boring in shale and soft sandstone; another bucket with hard-faced cutting lips, similar to the "orchard" auger, has proved successfully in clay and loam; a third type bucket having hard-faced cutting teeth welded to the bit, was found to be the best type of cutter for extremely hard materials. The success of any earth auger depends to a large extent on the design of the auger or cutting bit, and it is expected that increased speed of boring can be achieved by further improvements in the design and construction of the buckets.

This machine has been used in exploration of roadway cuts and borrow sites in a variety of soil formations, the maximum depth of boring being 70 ft. In formations containing large rock fragments the rate of boring is very slow, and one deposit of cohesionless sand and gravel was encount-



★ Power augur with mast down for transit



★ Left: Rear view showing rotary table, hydraulic feed, and bucket. Right: Rotary table, Kelly bar, and hydraulic push-down

ered which could not be bored due to caving of the free-flowing dry sand. Such material is, of course, difficult to sample with any type of equipment unless casing is installed.

With this type of machine it is necessary to pull the auger every foot or two, as the bucket is filled; this makes the drilling operation slower than with the rigs using the continuous helix auger. However, the bucket type of auger has the advantage of bringing up representative samples of each soil layer, with no intermixing of soil from different horizons, and exact depth of changes in soil character can be accurately determined; also, the samples retain more of the natural structure than is the case with the continuous helical augers, which thoroughly pulverize and break down any cemented materials or soft rocks.

The advantages of this shop-built power auger over the commercially made machines include: light weight and high mobility, making possible its use in difficult terrain and soft ground; ability to obtain large representative samples of each soil layer; the hydraulic feed, together with wide range of rotary table speeds, makes it possible to bore through most formations except hard rock or boulder soil.

The cost of manufacturing this first rig was considerably higher than the market price of comparable machines, due to development costs and changes in design during the fabrication of the rig. However, additional units could be made up at a cost somewhat less than similar commercial machines, provided six or more were built concurrently. It was contemplated that seven or eight of our highway districts would have use for this type of power boring equipment, but further field tests of this first model rig will be made before constructing such a number of machines.

Valuable Book for Excavator Owners

"Sizing of Excavators and Hauling Equipment," a 24-page bulletin, is the third of a series of technical bulletins which the Power Crane and Shovel Association has just released concerning power crane and shovel equipment. Prepared by Association members with the cooperation of hauling equipment manufacturers, it should prove useful as text material to engineering schools, students, professional engineers, contractors and others confronted with excavating problems.

The bulletin is intended to develop further the subject matter of functional fleet design, job application and ownership and operating costs previously covered in Bulletins 1 and 2. It deals with the problems of correctly sizing the excavator and hauling equipment and proper synchronization of hauling fleet with excavator to obtain maximum output and minimum delay in job operations. The study analyzes various factors affecting efficient operation on a job, such as type of material excavated, volume of work, spotting units at the shovel, distance of haul and hauling cycles, with practical suggestions on improving overall output.

Performance tables in relation to factors involved are given in the text and formulae upon which these tables are based are developed in an appendix. The study stresses the significance of the excavator being the heart of operations through which the blood of profit is pumped via the "arteries" of the haul units. Without adequate "pipelines," regardless of the ability of the "pump" to produce profits, income diminishes or stops while overhead and direct costs of the job continue.

Copies of this pamphlet, Technical Bulletin No. 3, may be obtained for 50c each from the Power Crane and Shovel Association, 74 Trinity Place, New York 6, N.Y. Furnished to engineering schools and colleges without charge.

CAA Policy for Airport Construction Clarified

In response to requests from various segments of the aviation industry for clarification of the recently-announced CAA policy for airport construction under the Federal Airport Act, D. W. Rentzel, Administrator of Civil Aeronautics, issued the following statement:

"It is a recognized fact that future aircraft design is toward aircraft less affected by cross-wind conditions. Further, the new airways traffic control system is aimed at speeding up en route traffic between ground points and reducing delays. A paramount requisite of this new program will be the increasing of the acceptance rate of present and new airports. The acceptance rate of airports can obviously be greatly increased by the simultaneous use of runways.

"Therefore, to further attain these objectives, the following policies, effective immediately, are hereby established, and will govern the CAA participation under the Federal Airport Act for *new* projects:

"Class I (personal) airports: CAA will participate in the construction or improvement of only one runway or landing strip on new or existing airports of this class. Exceptions will be made only where it can be demonstrated conclusively that traffic volume requires more than one runway or landing strip. (Where so demonstrated and approved, any additional runway or landing strip must be so located as to provide maximum utility.)

"Class II and larger airports: CAA will participate in the construction of an additional new runway or runways provided that such runway or runways are necessary to expedite traffic and so located as to provide simultaneous use.

"For airport planning purposes, CAA will participate in the acquisition of land in excess of that required to comply with the basic policy set forth above when determined necessary for normal expected expansion.

"Exceptions to the above policy will be considered by the Washington office when justified as necessary by the regional administrator.

"For the purpose of clarification and guidance it is desired to emphasize that this policy does not, because of contractual commitments, affect already approved projects."

Can New Joint Cleaning and Sealing Techniques Reduce Cost of

Pavement Maintenance?

By Lloyd Hale,
President, G. H. Tennant Company

HIGHER costs, tremendously increased traffic and nearly-doubled trucking ton-mileage since the war have lately focussed attention of highway engineers on an interesting new development—improved techniques in cleaning and sealing joints in concrete pavement.

Rekindled interest in this subject began with the introduction of various thermoplastic joint-sealing compounds of the "rubber" type and their experimental use in highway and airport applications.

Then, just about a year ago, a new type of machine was developed for the high speed cleaning of pavement joints in preparation for resealing. The versatility and apparent efficiency of this device at once attracted attention, leading to its adoption by several state highway departments, army and navy airfields, and by pavement maintenance contractors.

As an outgrowth of these developments, plus limited experimental work on selected highways, some long-established concepts of highway maintenance may be revised.

Many engineers and several states have adopted the policy in recent years of eliminating expansion joints. It now appears that this concept fits nicely in with other new ideas relating to new construction as well as maintenance.

At first glance it may seem audacious to rush in where angels fear to tread, but at least one has plenty of company. As *Fortune* magazine recently declared: "One of the difficulties about roads is that almost every American old enough to sit up in a car is an authority." And Commissioner MacDonald, of the Bureau of Public Roads, has sagely commented, "Most of the things we know about highways aren't so."

But this is exactly the point: unless we venture suggestions and encourage more extensive research in improved methods, our potential costs in maintaining America's vast highway system during the next 20 years will be still more staggering than today's totals.

An Old Problem

The idea of joint elimination, as everyone knows, is not new. As reported in *Engineering Experiment Station Bulletin, Series 363 (Illinois)* —under the title "Experiences in Illinois with Joints in Concrete Pavements"—highway engineers in many states have endeavored to find a means of laying pavement without joints. In some cases they later sought to control the contraction point by grinding, sawing, or cutting through the slab to a depth of ⅓ of its thickness.

A thought provoking line of reasoning. Comment from readers invited.—Editor

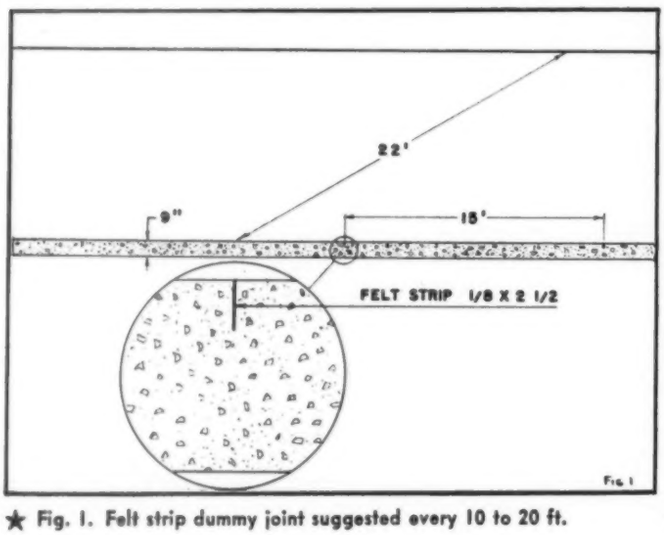
But, as has been determined by experience in California and elsewhere, it is very doubtful if control of contraction-location can be accomplished in this manner.

The reason is that the plane of weakness apparently occurs during the first 36 hours after the concrete is poured, during the initial period of hydration. It has been found that the contraction, when it becomes visible—perhaps a year or so later—may follow an irregular break just a few inches from the point of the saw cut. But in other cases the crack has appeared far from the saw cut—as much as several feet.

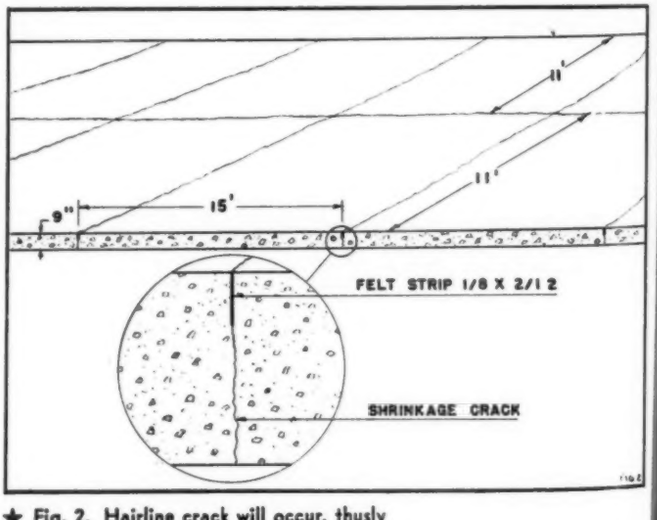
What is the answer? Are there better methods for controlling the contraction point and for reducing infiltration of silt, dirt and non-compressible material into the resulting crack?

One method that currently appears to merit careful study and experimentation is briefly summarized as follows:

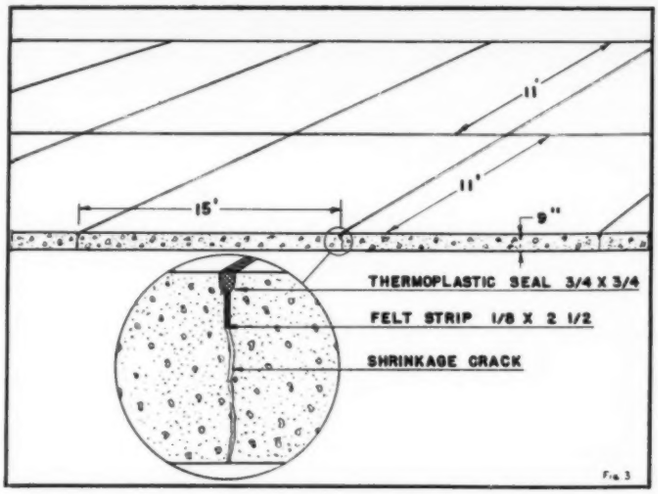
1. Use no expansion joints.



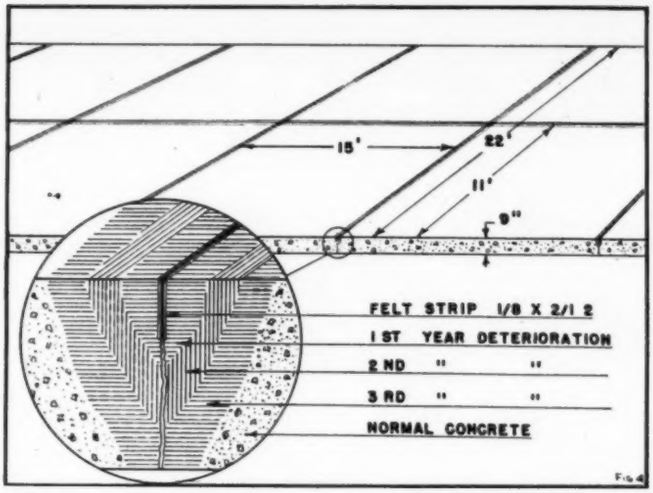
★ Fig. 1. Felt strip dummy joint suggested every 10 to 20 ft.



★ Fig. 2. Hairline crack will occur, thusly



★ Fig. 3. How dummy joint is to be grooved to ¾" x ¾" dimensions and sealed



★ Fig. 4. How deterioration can progress at ordinary dummy joint

2. Use a felt-strip dummy joint slightly submerged below pavement surface and spaced at 10-20 ft. intervals.

3. Make a groove ¾" x ¾" when the hairline crack occurs from contraction.

4. Seal with thermoplastic material.

It is suggested that the felt strip be thin—about ⅛ in. and from 2½ in. to 3½ in. wide (deep), depending on the slab thickness. It should be submerged ⅛ in. to ¼ in. below the surface, as is the present practice in Wisconsin, for example, so the finishing machine can progress without interruption. Some engineers prefer to bring the dummy joint to the surface, as is done in Iowa.

Opinions on Spacing

After the longitudinal center joints and dummy joints are constructed in this manner, an irregular hairline crack normally appears on the pavement surface when contraction first occurs. There is not entire agreement as to the exact spacing needed to eliminate irregular breaks between intended contraction locations, but it appears that spacing dummy joints at 15 to 20 ft. intervals should be effective under most conditions of thermal change, concrete strength and friction between pavement and soil.

As soon as the irregular hairline crack comes to the surface above the submerged dummy joint it should be mechanically cleaned and grooved with a mechanical joint-cleaning machine. With machines now on the market it is possible to rapidly cut a narrow, neat, workmanlike groove.

It appears that the crack should be grooved so as to leave a clean, sharp-walled channel approximately ¾" wide and ¾" deep. Laboratory and field studies should be made to determine optimum dimensions and profile of the groove. Experience thus far indicates that this procedure will assure an efficient bond with the new thermoplastic materials (either of the hot or cold mix types), the clean sidewalls serving to anchor the seal effectively. The speed of the grooving process now makes this procedure economical.

For sealing, it is suggested that a thermoplastic rubberized asphalt be used (meeting SS-F-336 specifications); or some suitable cold mix that meets Bureau of Reclamation or similar specifications. If proper techniques are used, none of the seal need appear on the surface of the pavement. By use of correct equipment, such as a squeegee-bottomed pouring lip on the seal applicator, joints can be filled so the thermoplastic material will be about ⅛ in. below the pavement surface.

Smoother Riding Joints

Properly cut, it is believed that such a grooved crack—if carefully sealed—should not be subject to further spalling. And the resulting pavement, free of surface extruded material, should ride more smoothly and have much longer normal life under traffic.

In this connection, mention should be made of another outgrowth of joint-sealing—the installation of reflective strips in highway center lines. It now appears entirely practicable to pour the centerline joint with white or yellow thermoplastic material filled with reflective glass beads, or mica or other reflective material. And if a 3 or 4 in. wide traffic division line is desired, the necessary groove for it—of correct width and depth—can be cut in one operation with a special head supplied as an accessory for mechanical joint-cleaning machines. The same equipment can be used for making almost any desired pattern in preparation for traffic lanes on any type of pavement such as Portland cement, bituminous cement or sheet asphalt.

But what are the results of the suggested technique—controlling contraction through felt strip dummy joints, followed by grooving and sealing the resulting hairline cracks?

Obviously, no clear-cut final answer can be given. For one thing, absolute data can only be obtained after several years' observation, as with any suggested maintenance procedure. For another, pavement behavior appears to be no more consistent, nationwise, than a crazy-quilt—due to the number of variables involved in pavement composition, hygroscopic characteristics of aggregates, sub-grades, climate, weather, traffic, etc.

Despite all this, and recognizing the need for a conservative appraisal, there are many points that seem to support the hypothesis that many expansion joints can be eliminated and pavement without such joints can be protected and preserved by this new technique.

Dirt-Filled Joints

For example, suppose you do *not* seal the hairline cracks and that dummy joints are spaced about 20 ft. apart. Isn't it reasonable to expect that there would be an opening averaging approximately 1/10 in. at each contraction-location during cold weather? And, of course, under some soil conditions there would be greater contraction at some joints than at others.

In any case the unsealed crack or joint is exposed to infiltration of some non-compressible material during cold weather. Then, when warm wet weather comes in June or July, maximum expansion takes place, setting up accompanying compression strains. These are most damaging at the point of least resistance, which is usually at the joint and particularly near the surface of the pavement. The strains

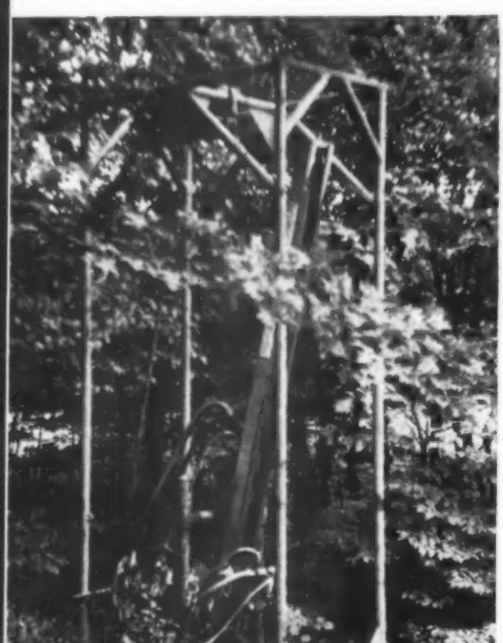
(*Continued on page* 62)

JOB and EQUIPMENT IDEAS

Rock Drill Frame Helps Get Going in Rough Country

The pipe frame seen sitting peacefully in the roadside bushes was assembled by the Harrison Construction Company's crew for making a start on rock excavation on their Pennsylvania Turnpike extension contract last winter.

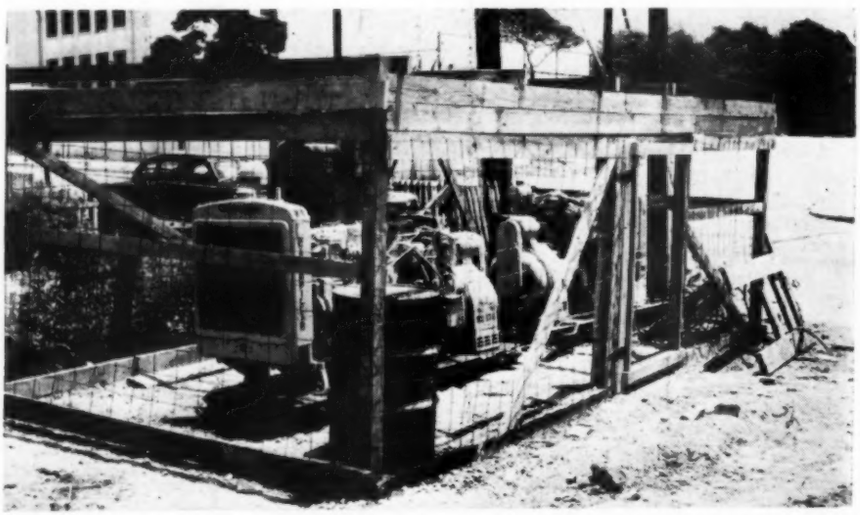
Their work required moving into one of the messiest boulder fields you could imagine, and the equipment simply couldn't get going until a path was started. This frame, into which a wagon drill mechanism is anchored at the base, was picked up by a crawler crane, set down in an accessible spot and held firmly "a la pile driver" while holes were drilled for a pioneer blast.



"Zoo Cage" for Contractor's Power Units to Keep Out the Kids

Seen a couple of years ago right in the heart of Los Angeles, and along a busy street, was this fenced-in power station. Consisting of a pair of Caterpillar diesel generator sets, it was erected along the Santa Ana expressway construction project by the Griffiths Co., contractors, who chose to generate their own power for field shop and other use.

The cage was screened across the top as well as the sides, using sections of pavement reinforcing mat over a stout frame. Presented to ROADS AND STREETS readers as an excellent safety tip on urban projects, since nobody knows when curious kids will try to get hurt.



Graders Sometimes OK for Finegrading

When the subgrade blanket material is given its final strike-off and smoothing, ahead of the paver, you see a variety of methods in use by our contractors today. These depend partly on the specifications, of course. Mechanical finegraders have come into their own, but it is also possible to do 90% of the final screeding job by use of a motor grader.

The grader pictured here was seen on the Guy F. Atkinson & Co. contract, along the Bayshore Freeway through Burlingame San Mateo, California. The motor grader, a Caterpillar No. 12, was equipped with a blade cut to a length fitting between the forms at 90° degree angle. About 11½ ft. length allowed leaway to prevent jamming up. Slightly flared headers were welded on both ends. One end was fitted with a ball-bearing-equipped roller, for riding the adjacent concrete slab, which was kept clear of dirt, sand and debris by a worker with broom. The other end was fitted with a sliding shoe, easily unbolted for replacement.

A light hand-drawn strike-off screen smoothed the slight tire indentations ahead of the paver. The grader also performed other tasks without blade change.

Engineer's Estimates

Should They Be Public Information?

A thought provoking analysis of both sides to a question that is of wide concern

By E. T. Nettleton
Associate Highway Engineer, State Highway Department of Connecticut

GENERALLY speaking, the publication or the withholding of the engineer's estimate, either before or after the opening of bids, is a matter of policy rather than law. The law usually states that the commission or commissioner must comply with the following rules: they shall receive open competitive bids; they shall, if they award a project, make such an award to the lowest responsible bidder; they shall have the right to accept or reject any or all bids in accordance with the best interests of the state. Public advertising, public opening, and public reading of the bids comply with the first point mentioned. The qualification or consideration of bidders either before or after the letting, determines the responsible bidder and meets the second point. An engineer's estimate is one means employed to judge whether an award is to the best interests of the state and, therefore, helps in determining the third point.

Difference of Opinion

It has always been a debatable question with engineers, public officials, contractors and bonding representatives whether publication of the engineer's estimates is or is not an advantageous procedure for all concerned. It is quite evident that even within each of the four classifications which have been mentioned, there is a difference of opinion. In the light of this disagreement, the layman might feel that some compromise system might be adopted. Unfortunately, there is no compromise between a "yes" and a "no". Either an engineer's estimate has to be published or it has to be withheld. To have it known to some bidders and unknown to others would be unethical, unfair, and discriminating. Unfortunately, there are some engineers or officials who, through ignorance or lack of proper consideration of this problem, disclose their estimate before bids are opened to those bidders who happen to request this information. I think all will agree that this disclosure to favored ones is not fair to those bidders who might assume that the engineer's policy was not to give out the figures.

The policy of publishing engineer's estimates before the letting is practiced by the public works department, State of New York, most cities and towns throughout the U. S. and by about 50% of our consulting engineers. A diametrically different policy, which does not disclose the engineer's estimates until after awards are made, is the method employed by the state highway department of Connecticut as well as by most other state highway departments.

I have been told that the Public Works Department of the State of New York is compelled by law to publish their estimate. I have also been given to understand that the majority of contractors in that state are opposed to this policy established by law.

From previous experience with the highway department of Pennsylvania, with two contracting firms, and with the highway department of the State of Connecticut, I must frankly admit that I am opposed to the publication of the engineer's estimate. Perhaps I have been swayed to this viewpoint from environment or maybe because I have never heard such strong arguments in favor of publication as have been given in favor of non-publication.

Arguments Favoring

I shall, however, take the time to state those arguments favoring the publication of the engineer's estimate which have been brought to my attention.

First, it is admitted that engineers make up an estimate in order to set up appropriations and to serve as a yardstick in the consideration of projects to be awarded. Since this is necessary, and since the engineer's estimate passes through so many hands, there are those who feel that the engineer's figures will leak out. Therefore, these persons feel that the estimates might just as well be published. This, in my opinion, is a rather weak argument. It is a reflection upon the integrity and honesty of engineers and public officials. Furthermore, it assumes that engineers and public officials cannot devise a satisfactory procedure to prevent the disclosure of confidential information.

Second, some contractors feel that the publication of the engineer's cost estimate saves the contractor the time and expense of looking over a job which is too large for their financial capacity. Perhaps there is some merit to this. However, a short perusal of the quantities in the various unit items listed in the advertisement to contractors should give any experienced contractor an immediate check regarding this matter.

Third, some contractors feel that the publication of the engineer's cost estimates saves them the time and expense of looking over a job, which they feel they can not do for the amount of money specified by the engineer. This assumption is not too well founded. Without an actual study of the plans, and without a thorough investigation of the site condition, no contractor is capable of correctly judging whether or not he can do the job for the price of the engineer's estimate.

Fourth, some engineers feel that the knowledge of the engineer's estimate will prevent the inexperienced or unqualified bidder from being too optimistic in placing his bid. In answer to this, there are engineers who feel that the inexperienced and unqualified ought not, in justice to other contractors, and to the State, be allowed to place a bid, and that publication of an estimate encourages, rather than discourages, the novice from taking a chance.

Fifth, many bonding companies rely on an engineer's estimate as a check on the figures of the contractor. Since the bonding company is a partner in the contract, and will be called upon to complete the job should the contractor fail, the surety does not want a check by some state engineer on a theoretical basis, but one by an experienced construction estimator on a practical basis.

Reasons For Withholding

On the other side of the picture, the following factors, in my opinion, favor the withholding of publication of the engineer's estimate.

First, a condition, which all too many engineers and contractors overlook is that the engineer's estimates could be wrong. From many years of experience in estimating, both as an engineer and as a contractor, I am certain of this point. My reasons for this assumption will be discussed later. Unfortunately, too many bidders are influenced in their bidding by the engineer's estimate. Just what are the results? When the engineer's estimate is too high, the unsuspecting contractor is inclined to bid high and lose the job against competition. When the engineer's estimate is too low, a contractor is inclined to bid a little bit lower. As a result of this action on his part, he is saddled with financial losses on the project, and he has taken the business away from a contractor who had properly investigated, and who had bid the work at an adequate price. It is also quite possible that some court might construe that a particular engineer's cost estmate was "misleading" to the contractor.

Second, the qualified contractor usually feels that he is better protected against the venturesome unreliable bidder when the latter is unable to use the engineer's estimate as a crutch to obtain the job.

Third, a qualified contractor may become too confident in the reasonableness of the engineer's estimate. He may arrive at his conclusion from the comparison of his costs on jobs formerly completed with the engineer's estimate on those same projects. As a result, under pressure of time, he may bid the next job slightly under the engineer's estimate without considering the project variations or the engineer's idiosyncrasies in figuring.

Estimate May Mislead

Fourth, the withholding of the engineer's estimate forces each contractor to do his own practical bidding. This requires the contractor to keep better job cost records, adopt a more scientific method of estimating, and to give better consideration to the problems and the unusual hazards on each particular project. When a contractor receives a job after complying with these conditions, his chances of success are greatly improved over the bidding by the guesstimating system.

I previously stated that the engineer's estimate could, on occasion, not only be misleading, but definitely wrong. Unless this is true, how can one account for the fact that many reliable contractors place bids which are often at a variance of 20 to 50% from the engineer's estimate. When the three low bidders are this much above the engineer's estimate, the fact may be that none of the bidders are keenly interested in this project. When as many as three low bidders are well below the engineer's estimate, a plausible explanation is more difficult. The existence of one extremely low bid might be explained as an error on the part of the bidder, for contractors also make mistakes. The law of probability, however, would not validate this assumption when there are several bidders, all of whom are considerably under the engineer's estimate. It is recognized, and I believe contractors will admit that, upon occasions, all have probably bid on jobs at cost without including profit. Some of the reasons for this are to keep personnel employed, to obtain rental on idle equipment, or to avoid excessive taxes. There is a question regarding whether or not this is a good policy for the industry as a whole. Certainly from the State's angle, there is no objection. It is a wise state official who takes cognizance of this fact in the advertisement of his bids. It is my personal assumption, from having been associated with two contracting concerns within the last decade, that there have not been profits ranging from 20 to 50% of the total cost on state highway contracts. If the engineer's estimates had been correct, why should the contractors have bid from 20 to 50% under the estimate, even though they had elected to do the job only for cost and without profit.

Gross underbidding of engineer's estimates is a rather common occurrence. Within the past two years, we have had several cases in Connecticut where it has been definitely proven that our engineer's estimates were wrong. We have since revised our methods of estimating, and we have gone a long way in correcting the situation. We still have room for improvement.

Without going into the details of our procedure in Connecticut, it might be well to discuss the methods of estimating generally employed throughout the country by the various highway departments, of which methods there are two: the average unit price method, and the practical scientific method. In between the two may be any number of modified procedures, depending upon the care, effort, and experience of the estimator.

Unit-Price Method

The average unit-price method is by far the easiest. Under normal conditions which existed before the war, fifteen to twenty bidders were after each job. Wages for labor were stable and the costs of materials were constant. The system worked out with fairly good success, except for the unusual job. This system is extremely easy to work out and any engineer's helper or even a stenographer, who can add, multiply, divide, and compute weighted averages can complete an estimate. He can apply the average of past unit prices to individual unit items by multiplying them by the quantity of the item, and then by adding the extensions, arrive at his theoretical estimate. I doubt, however, if any competent contractor would hire such a person to make up his bid, nor would the contractor have the audacity to hand in a bid without investigating the site.

Methods Compared

The practical, scientific method is by far the most difficult one. On the other hand, only this method could stand a thorough investigation. This method necessitates that each individual project must be investigated regarding current wage rates, current material quotations, up-to-date equipment charges, lengths of haul, types and amount of excavation, sub-soil conditions and other pertinent factors.

Unfortunately, most state highway departments use the average unit price method with only a limited theoretical revision of a few major items. There are several reasons for using this system: first, it is the easiest; second, they do not have the personnel qualified to use the more practical method; and, third, the foundation of estimates as required by various agencies have in the past been based on average unit prices.

I might interpose here with the question "How many highway or public works departments, whether federal, state or local, have engineers in their employ who have had practical field experience in actually estimating construction work"?

As a result of a few cases previously mentioned, where the original engineer's average unit price estimates were proven to be wrong, we in Connecticut revised our methods of making up engineer's estimates.

It is interesting to note that in the period from Jan. 7, 1946, to Aug. 19, 1946, there were ninety-nine projects advertised for bidding. All of these projects were originally estimated using the average unit prices method. They were also estimated using a scientific method, which took into consideration the actual conditions pertaining to that job. By using the first method, thirty-three projects would have had to be rejected. By using the second method, only eight projects were rejected because of excessive prices. It was possible in these in-

(*Continued on page* 62)

Bituminous ROADS AND STREETS

"GOOD PRACTICE" PICTURE

December, 1949

Starting the sealing run on a strip of paper may be "primer stuff," but this detail to avoid fat spots is still side-stepped sometimes. W. W. Clyde & Co., of Springfield, Utah, contractor

Baltimore's "Operation Asphalt"

How seven contractors teamed up to pave 14 blocks of arterial Baltimore Street in one day, placing 23,500 sq. yd. of 2 and 3 course hot-mix in a single 13½-hour stretch. Season's climax in a remarkable 4-year, 15-20 million dollar street resurfacing program which has included 285 miles to date

By Walter R. Macatee,
Special Correspondent to
Roads and Streets

AS any street official can attest, major improvements of surfaces, and the raising of street structures to fit a new grade on a principal arterial thoroughfare is a time-consuming, traffic-slowing job. Even if such an improvement is an ordinary resurfacing operation, with the attendant raising of manholes, it is a major undertaking, causing serious traffic disruption. If the city carrying on such improvements is a large and busy municipality, such interruption can be a very costly item to motorists and truck owners unless painstaking efforts are made by all concerned to reduce the tie-up time to a minimum.

That Baltimore—one of America's metropolitan cities—succeeded in preventing any delay whatever to traffic, while completely rehabilitating the busiest portion of its principal east-west arterial street, is due to the careful planning of the city's Bureau of Highways and the whole-hearted cooperation of seven of the city's asphalt paving contractors.

Mile-a-Day-Paving

To these groups, Baltimore citizens owe a debt of gratitude for accomplishing in record-breaking time the modernization and beautifying of a mile of old street with its badly cracked and worn pavement. This mile consists of Baltimore Street from the east side of Calvert Street, in the downtown financial district, to the west side of Fremont Avenue, just beyond the city's heavy trucking area which Baltimore Street serves. From a rough, traffic-slowing surface of forbidding appearance, the pavement was transformed into a modern, sightly and smooth-riding street by paving its full 40 ft. of width with 3½-in. thickness of binder course and sheet asphalt—23,466 sq. yd. in all. All of this was accomplished in only 13½ hours. Portions of the street, in areas where there were few manholes to slow down paving, were opened to traffic in the remarkable time of 9 hours and 38 minutes after the first load of "hot-mix" arrived at six o'clock Sunday morning, October 16.

Equipment Brightly Painted

Sunday, when the truck traffic would be the lightest, was chosen as the best time to repave. City officials and the contractors' crews scheduled the time. Even though an emergency existed, and thus justified the decision to operate on Sunday, the greatest enthusiasm and willingness "to put out" was displayed by workmen, contractors, engineers and other city officials alike. Almost a gala spirit prevailed throughout "Operation Asphalt," beginning at daybreak, and extending to the time when the last rolling was completed by one of the eighteen 8- to 12-ton rollers on the job.

The entire fleet of 10 Barber-Greene asphalt finishers, like the rollers and other street equipment, were as brightly polished and painted as though on parade before a "Spit and Polish" Admiral. The 70-odd trucks, which carried hotmix from seven distant asphalt plants, also presented a modern appearance. The 154-man street force—rakers, shovel men, roller operators, and the 2-man crews on each of the finishers—shared the spirit of the occasion.

Baltimore Street's revamping was not intended to be accomplished in record-breaking time when the city took bids on this important resurfacing last July 6. Shortly after bids were received, the work was awarded to P. Flanigan & Sons, Inc., old-time Baltimore asphalt contractors. As the time for work to begin drew close, it was realized that block-by-block or lane-by-lane construction would greatly slow down traffic in this area, the very heart of Baltimore. Accordingly, city officials and Pierce Flanigan, a principal in the contracting firm, worked out an agreement to do the resurfacing in a manner to avoid undue traffic delays. Even though Sunday work

(*Continued on page* 52)

★ View of binder course and (left) wearing surface of sheet asphalt, near intersection of Pine and Baltimore Streets. Resurfacing here is to extend only to gutter line. Binder course not extended to edge, to permit "feathering" of surface course at edge

Mr. Macatee until recently was Manager, Airport Division, American Road Builders' Association. Since preparing this article he has joined the headquarters staff of the Civil Aeronautics Administration at Washington, where as one of his duties he will specialize in the problems of developing city-to-airport highways in cooperation with other governmental agencies.

for CHEWING ROCK....

Cedarapids Built by IOWA

Highest Quality Equipment means

JUNIOR TANDEM

A rock-chewing workhorse for an all-around variety of rock and gravel jobs, quality-built for big volume production and low-cost operation. The Cedarapids roller bearing jaw crusher used is engineered for maximum capacity and minimum maintenance; exclusive bearing seals reduce lubrication time and expense; heavy, counterbalanced flywheels slash power requirements. The high capacity, heavy duty roller bearing roll crusher is made with manganese steel roll shells to guarantee long wear and economy. Cedarapids *horizontal* vibrating screens provide more accurate grading, larger capacity, better screening action and lower maintenance. In addition to these cost-cutting quality advantages, you get capacities ranging from 70 to 100 tons per hour, *and more,* of 1" material. Complete portability, plus fast set-up and take-down, gets machines on the job fast. It's a money-maker on any rock or gravel job!

Cedarapids AGGREGATE PRODUCING Equipment

4033 HAMMERMILL SECONDARY

HERE'S a peak-efficiency machine for a wide variety of reduction jobs. 100 to 180 tons of 1½" roadstone, or 20 to 60 tons of agricultural limestone, or a percentage of both can be produced in one operation. The Cedarapids heavy duty hammermill features a new principle of crushing to give a larger output of finer and more uniform finished products, and will produce more tons per hour than other comparable types of pulverizing equipment. A separate power unit with variable speed control operates the hammermill to produce the type of finished product desired without affecting the speed of screens and conveyors. Convenient portability, fast and easy set-up and take-down, minimize lost time between jobs. And for double duty service that puts money in your pocket, you can interchange the 4033 hammermill unit with a 4024 Cedarapids roll crusher to make this plant a high volume rock crushing secondary.

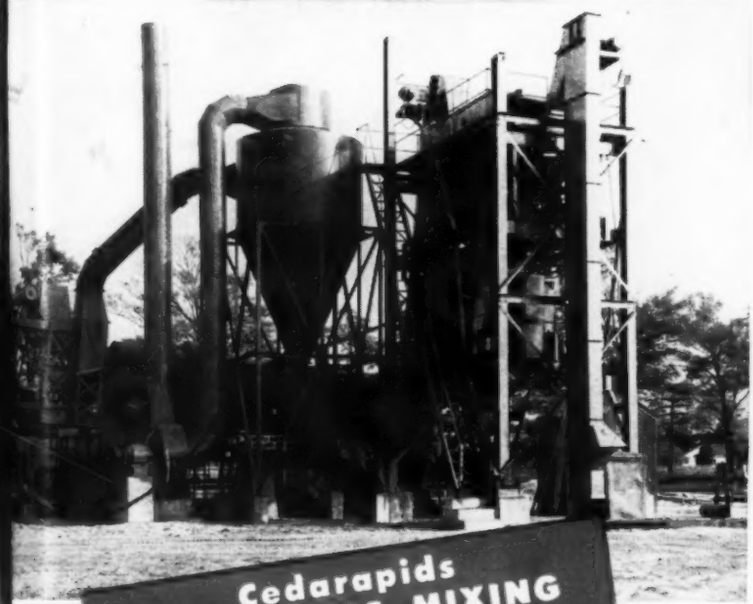
Buy the best . . . Buy Cedarapids

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U.S.A.

. . . or SPOUTING BLACKTOP!

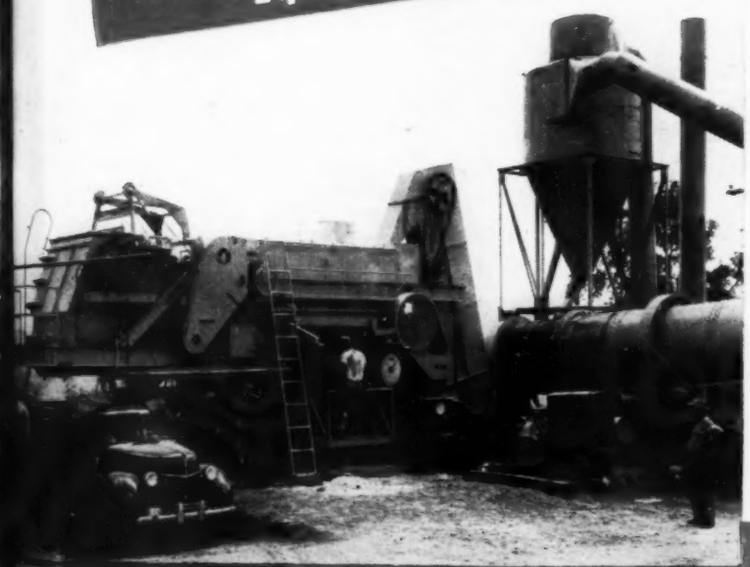
BIG VOLUME OUTPUT
MINIMUM MAINTENANCE
LOW COST OPERATION



Cedarapids BITUMINOUS MIXING Equipment

MODEL "E" BITUMINOUS MIXING PLANT

FOR "spouting blacktop" in volumes to meet your biggest production needs. This all-electric batch type plant handles 2000, 3000, or 4000 lbs. per batch, combining high capacity and accurate batching with great portability and economy. Perfectly matched screens, batchers, pug mills, elevators and driers meet the most exacting specifications with a smooth, steady flow of material. The Cedarapids-Symons horizontal vibrating screen, with the driving unit mounted outside the hot zone, is fully protected from heat and dust. Cedarapids famous twin shaft pug mill thoroughly mixes the bitumen and aggregates at high speeds. Aggregate is thoroughly dried by Cedarapids driers. Individual electric motor drives on all units assure smooth, efficient operation and low maintenance costs. Push-button controls are centrally located within easy reach and sight of the operator.



MODEL "FA" BITUMINOUS MIXING PLANT

PORTABILITY plus! The Model "FA" is the most portable batch type bituminous mixer in the Cedarapids line, and can be set up for operation in a matter of hours. Just lift the top section of the elevator, extend the bottom section and install the cover; drop the operator's platform and lower section of the skip track into position; raise the skip head pulley frame; level up the scale frame and the "FA" is ready to grade the aggregates, weigh the material, mix it to meet the most rigid specifications, and do it all at lower cost. The perfectly matched screen, 25 cu. ft. batcher and pug mill, and elevator will produce as much as 350 tons per day. Centralized air controls insure fast, easy, one-man operation. Quality construction of every part means long-term service at lowest cost operation and maintenance.

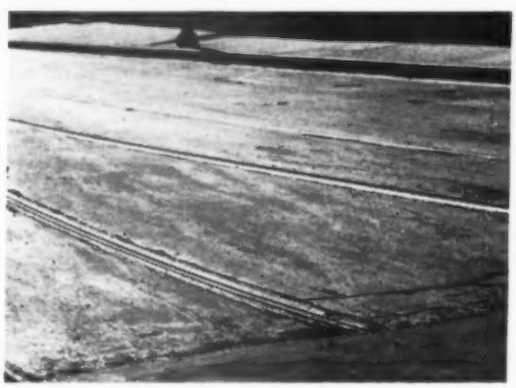
Cedarapids Built by IOWA

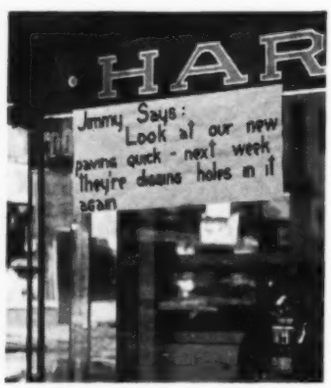
The IOWA LINE *of Material Handling Equipment Includes:*

ROCK AND GRAVEL CRUSHERS • BELT CONVEYORS – STEEL BINS • BUCKET ELEVATORS • VIBRATOR AND REVOLVING SCREENS • STRAIGHTLINE ROCK AND GRAVEL PLANTS • FEEDERS–TRAPS • PORTABLE POWER CONVEYORS • PORTABLE STONE PLANTS • PORTABLE GRAVEL PLANTS • REDUCTION CRUSHERS • BATCH TYPE ASPHALT PLANTS • HAMMERMILLS • DRAG SCRAPER TANKS • WASHING PLANTS • SOIL COMPACTION UNITS • STEEL TRUCKS AND TRAILERS • KUBIT IMPACT BREAKERS

★ Stand-by asphalt finisher, ready for instant use if needed. Luckily, it was not required

★ Pierce Flanigan, one of the principals of the primary contracting firm; James H. McKay, Baltimore's Highways Engineer; William Chilcote, Deputy Highways Engineer, and author Walter R. Macatee





★ Left: Paved areas at intersections were extended into "wings" of intersecting cross streets. This shows such a "wing" on a street which crossed West Baltimore Street. Right: A wag takes a good-natured "dig", explaining why resurfacing is often made necessary

(*Continued from page* 49)

meant paying overtime wage rates, the contractors readily agreed to the City's plan to perform the resurfacing on a Sunday—and at no extra cost to the city. All of the other six asphalt contractors who do work in Baltimore agreed to help out.

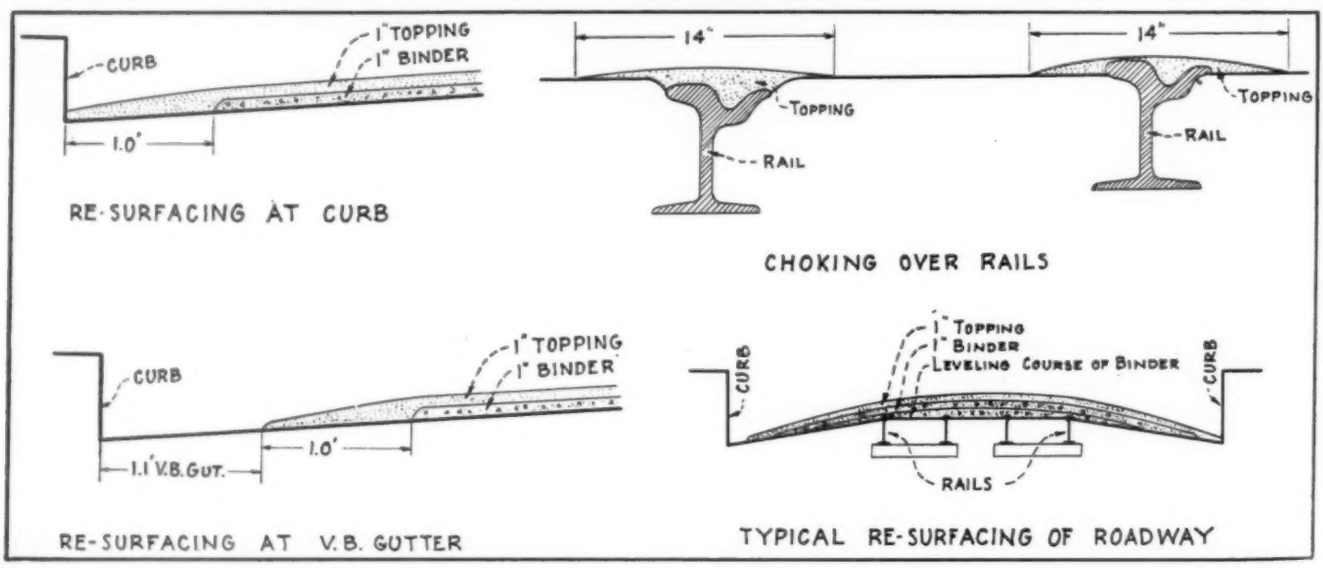
7 Work Sections

The mile-long contract is bisected by 14 north-south streets. There were seven contractor crews. So, the work was easily divided up, each contractor assuming responsibility for a 2 block stretch averaging about 750 ft. long and 40 ft. wide. Easy division of the 492 manholes and other structures within the boundaries was not possible; consequently, Pierce Flanigan agreed to perform that portion of the work, which contained the largest number of impediments to speedy paving.

As one might suspect, much preparatory work preceded actual repaving. This time-consuming work involved cutting out and raising the 492 surface structures, bringing them up to the new grade; cutting out and repairing numerous broken areas in the old base; maintaining traffic and creating no traffic hazards while doing all preparatory work. All advance preparation was accomplished by the prime contractor in five days before the resurfacing. High-early-strength portland cement aided the job.

The spectacular operation of resurfacing drew praise from hundreds

(*Continued on page* 55)

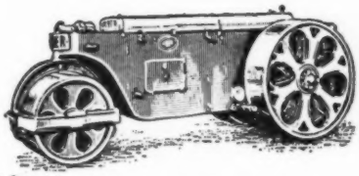


★ Plate I—Typical resurfacing details

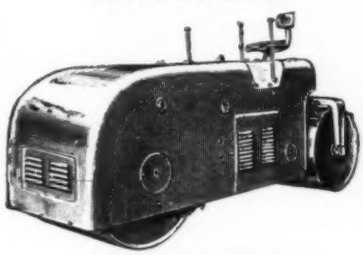
how?

USE THE HUBER MAINTAINER

On Jobs Now Tying Up Big Equipment



HUBER 3-WHEEL ROLLERS
4 models—5 to 12 tons



HUBER TANDEM ROLLERS
5 models—3 to 14 tons

Put the versatile Huber Maintainer to work on your new construction or maintenance program. It will "pay off" by doing cheaper and faster the many odd jobs and maintenance work now tying up heavy equipment. It's a money maker in its own right—ideal for road, street and airport construction and upkeep. With its 42½ H.P. engine and 20 miles per hour speed the Maintainer really covers the job. With its hydraulically operated attachments it is readily converted to a bulldozer, patch roller, rotary broom, lift-loader, snow plow, berm leveler, road planer or mower. Ask any Huber owner about the Maintainer—he'll vouch for its dependability, long life and all-'round performance.

Other Huber road machinery built to make your construction work more profitable includes: 3-wheel automotive type road rollers, tandem rollers and trench rollers. Write today for descriptive bulletins and name of your Huber dealer.

HUBER

THE HUBER MFG. COMPANY
Marion, Ohio, U.S.A.

HUBER *3 Wheel • Tandem*
ROAD ROLLERS
and
MAINTAINERS

★ Typical view shows seven of the 492 manholes and other street structures which needed to be raised

★ Left: Hand raking asphalt binder at one of the intersecting "wings". Right: Topping, in this case, was carried to the curb line; in some cases resurfacing extended only to the outside edge of the gutter line

(*Continued from page* 52)

of Sunday "sidewalk superintendents" who thronged the walkways. This caused "Operation Asphalt" to seem much like play to the seven good natured teams. Each team averaged about 22 men, in addition to drivers of 10 trucks on each team. Also backing the teams were the seven plant crews plus 35 truck drivers who kept the asphalt plants supplied with raw materials.

The city's crew included 14 asphalt plant inspectors and 14 paving inspectors. All told, 36 engineers and officials represented the department of public works on the job. They included director of public works Paul L. Holland; highways engineer James H. McKay and general superintendent G. V. Walters in the bituminous construction division, bureau of highways. Deputy public works director George A. Carter, and McKay's deputy, William Chilcote, also were on hand from before 6 a.m. until well after the "all's clear" signal given to traffic at 8:30 Sunday evening.

Contractors' Plants, $2,500,000

Equipment engineers estimated at $2,500,000 the value of the plants of the seven contractors. This included their plant sites, stand-by equipment and working capital. Listed as used in resurfacing Baltimore Street were the following:

7 asphalt mixing plants
10 asphalt finishers
18 rollers (8 to 12 tons)
9 air compressors
7 asphalt spray machines (for tack coating)
105 motor trucks

In addition to this mobilization of modern construction equipment, besides many stand-by units, the job called for a sizable array of trained contractor personnel at the mixing plants and at the job-site, as follows:

7 general superintendents
21 foremen
42 machine operators
105 truck drivers
70 skilled laborers
35 unskilled laborers

280 Total

Cooperating with the prime contractor, P. Flanigan & Sons, Inc., the following Baltimore asphalt contractors took part:

American Paving & Contracting Company
Arundel Construction Company, Inc.
Baltimore Asphalt Block & Tile Company
Mahoney Brothers Company
The National Paving & Contracting Company
Potts & Callahan Paving Company, Inc.

Also to be noted was the excellent work of the Baltimore police department in controlling traffic during the job. Some 200 policemen participated under inspector Bernard J. Schmidt of the traffic division.

Public Calls for More

Already one of Baltimore's leading papers, *The Sun*, is editorially calling for more of "Operation Asphalt," saying in part under that caption:

"The public, having been treated to the wonder job, is not likely to put up with anything less than wonders when it comes to paving the (other) main streets in the heart of the downtown business section."

The 14-block Baltimore Street project represents but a small portion of

(*Continued on page* 57)

★ Asphalt mixing plant of the American Paving and Contracting Company, one of the seven contractors that made "Operation Asphalt" successful

Four steps to restore worn surfaces...FAST!

Asphalt resurfacing affords a rapid and economical means of providing any worn or broken pavement with a smooth-riding, easily maintained surface. For city streets or four-lane highways, the four steps outlined here describe one method of asphalt application that produces sound, long-wearing roads.

A Standard Oil Asphalt Representative can suggest other economical types of asphalt construction to meet your needs and local conditions. You are assured prompt delivery of Standard Oil Asphalt from any of the five large refineries located throughout the Midwest. Write Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Ill.

STANDARD OIL ASPHALT

1 Spot Patching—Where the old highway is badly broken, holes are patched by filling with an asphalt-aggregate mix delivered hot from a central mixing plant.

2 Prime Coat—This is a thin coat of cut-back asphalt spread over both the old road surface and the patches that have been brushed clean. It helps to bind the asphalt to the old surface.

3 Binder Course—An asphalt-aggregate mix is delivered hot from the central mixing plant to an asphalt-finishing machine, and is laid from 2 to 3 inches deep over the old road surface and patches.

4 Wearing Course—This is the top course composed of asphalt, stone, and sand. It is mixed hot at the central mixing plant and laid by machine. This top course presents a smooth, waterproof, long-wearing surface which requires no seal coat or stone application.

STANDARD OIL COMPANY (INDIANA)

STANDARD

(*Continued from page* 55)

Baltimore's paved areas which city officials have determined to rehabilitate and bring up to high and modern standards.

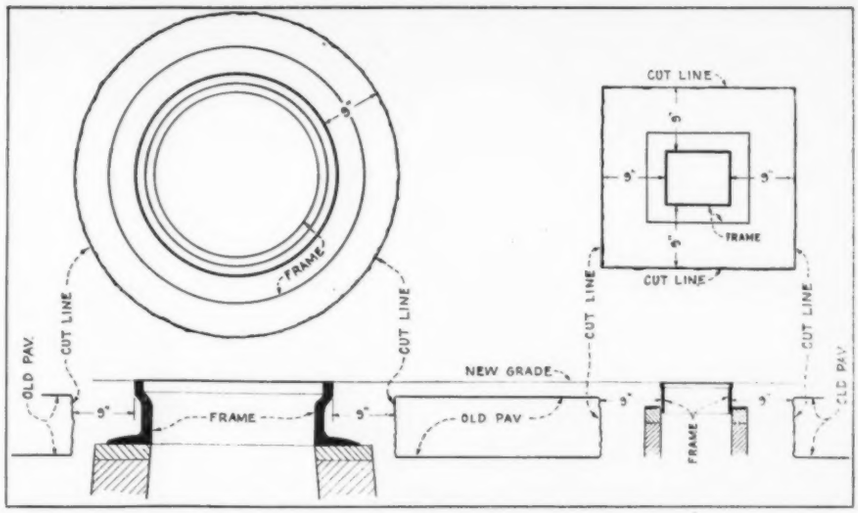
The city's entire system of streets, 1200 miles, have paved areas in excess of 19,000,000 sq. yd. Roughly, 70% of these surfaces consist of some form of bituminous material, principally on rigid bases; 20% is portland cement concrete, and 10% miscellaneous types. The average composite age of these areas has been estimated to be more than 30 years; some were paved before the advent of the 20th century.

The end of World War II found many of Baltimore's street bases and surfaces badly disintegrated because of inadequate maintenance and heavier traffic loads. To make matters worse, Baltimore's system of street cars, operating on fixed tracks of steel, was rapidly giving way to buses. This called for strengthening and rehabiliating practically all of the paved areas on the city's principal streets, to accommodate a new form of mass transportation. Moreover, there had come about a great addition in the number of motorized pleasure cars and commercial trucks.

$90,000,000 Plan Proposed

A survey was made, and apparently trustworthy data were presented which showed that Baltimore needed to completely reconstruct many of its older pavements. These data called for an outlay of $90,000,000 for building almost a completely new street system. Of this, $75,000,000 was estimated to be the cost of new construction, and $15,000,000 was ear-marked for interest on that portion of the cost which would be paid for from bond issues required. This meant an average outlay of $90 for new streets by each of Baltimore's 1,000,000 citizens—men, women and children.

When Mayor Thomas D'alesandro took office, orders were given to make a new survey. The city's bureau of highways, in the department of public works, was told to seek means of bringing street surfaces and foundations up to modern standards to meet current and future needs. But, at the same time, its officials were told to seek every means to do the work for substantially less than the estimated $90,000,000. The Mayor, backed up by the support and urging of the quasi-official Commission on Governmental Efficiency and Economy, appointed a body to make a study of the problem. Exhaustive engineering studies were made by technical staff members in the city government, and a comprehensive report was made which recommended that a program of street rehabilitation be carried out over a period of about four years, to cost only about one-fifth as much as the former estimate, $90,000,000. Such a program was approved at the beginning of 1948, and Mayor D'alesandro ordered it started at once.



★ Plate 2—Typical detail for adjusting manhole frames and other utility covers

This 4-year, $15- to $20-million program is now about half completed. It consists of (1) strengthening and repairing foundations of the old streets, where needed; and (2) resurfacing them with an average thickness of three inches of asphaltic concrete or sheet asphalt. As a rule, the latter is laid in two courses. In exceptions a third layer or leveling course is installed. In addition, rails of abandoned car tracks are covered over with a "choking" of sheet asphalt surfacing prior to installing the upper layers.

Locally, Baltimore's resurfacing program is referred to as "One inch, plus an Inch." This, however, is misleading inasmuch as the average thickness is about 3 inches, due to the leveling course requirement. Plate 1 shows the location of leveling courses, as well as "choking" of car track rails when resurfacing is done.

5,000,000 Sq. Yd. Completed

Since the program started, surfaces totaling five million square yards have been put under construction. This much will have been completed before the 1950 program will begin. Translated into 30-ft. streets, 285 miles will have been resurfaced by the end of 1949, at an expenditure of about $10,000,000. The first year (1948) saw the completion of 2,260,065 sq. yd. of asphalt resurfacing, as follows:

Sheet Asphalt & Binder	1,784,939 sq. yd.
Asphaltic Concrete	475,126 sq. yd.

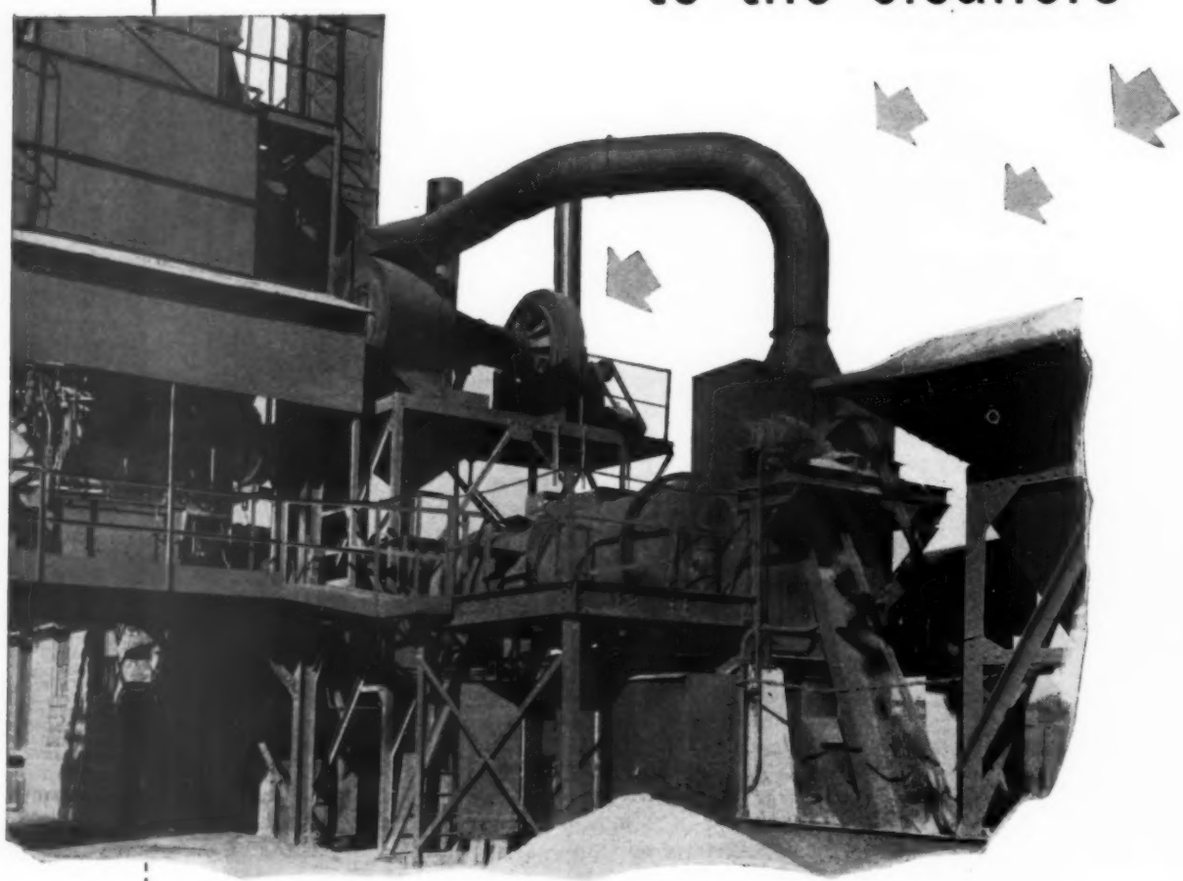
Included in the above is about 75,000 sq. yd. of new construction.

Many of the very old sheet asphalt streets in Baltimore cracked quite badly, due largely to the fact the mix-

(*Continued on page* 59)

★ Long after dark the finishers still kept going to complete the 23,000 sq. yd.

ROTO-CLONE takes another asphalt plant to the cleaners



A BUSY season is coming up for this big asphalt plant. And the aggregate dryer will be the source of plenty of dust—but no complaints. That's because a Roto-Clone* is on the job.

The unit, which is mounted directly above the aggregate dryer, consists of a Skimmer Precleaner used in conjunction with a Type W Roto-Clone (Arrangement A). The dust-laden air from the dryer is first drawn into the Precleaner where a high percentage of the material is collected dry for salvage.

From the Precleaner, the air passes into the Type W Roto-Clone where dynamic precipitation is combined with water sprays to trap the finest and lightest dust particles. The air is then exhausted dust-free while the collected material and water are discharged in the form of a thin slurry.

Why not make dust-control your business before the community makes it theirs? Scores of asphalt plants have solved this problem with the proper application of Roto-Clones. Complete information can be obtained from your local AAF representative or by writing direct to:

AMERICAN AIR FILTER COMPANY, INC.
306 Central Avenue, Louisville 8, Ky.
In Canada: Darling Bros., Ltd., Montreal, P. Q.

AAF

ROTO-CLONE®
DUST CONTROL EQUIPMENT

**Roto-Clone is the trade-mark (Reg. U.S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.*

(*Continued from page* 57)

tures were heated to an unduly high temperature, and were mixed too long. Both of these practices tended to oxidize the asphalt cement and reduce its already-low penetration, causing it to crack under the influence of foundation expansion from temperature changes. Under present requirements the asphalt cement used in producing sheet asphalt mixtures is 70 to 85 pent.—much softer than that previously used. Moreover, the maximum mixing time of the mineral materials with the asphalt cement is limited to not more than 60 seconds. Of equal importance, the maximum temperature of the asphalt cement during mixing operations is rigidly kept at 350° F. or less. These requirements, (a) relatively soft asphalt cement; (b) relatively short mixing time; and (c) maximum temperature of 350° F. all tend to make modern sheet asphalt pavements crackless.

★ Loading one of the first truck-loads of the "hot-mix"

★ Truck discharging binder course for hand raking at a mid-town point on Baltimore Street

An important factor in Baltimore's resurfacing program is the practice of giving old surfaces a tack coat of asphalt emulsion before the new surface is installed. The asphalt emulsion, the "quick breaking" kind, is applied with a pressure sprayer at the rate of 0.15 gal. per sq. yd. A strong bond thus is created between the old surface and the new overlying courses, and no planes of cleavage can be detected.

In addition to the large resurfacing operations, the city carries on an extensive surface treatment program. This consists of light applications of tar or asphalt and stone chips. The total thickness of surface treatments is almost negligible, but they have the effect of preserving the life of old bituminous surfaces which do not require the more elaborate treatment accorded old pavements which are resurfaced with plant-produced sheet asphalt or asphaltic concrete.

Pay-as-You-Go

Whereas, it was first suggested that Baltimore spend $90,000,000 to reconstruct its streets, issuing bonds to cover this huge expense, the plan of resurfacing and salvaging the old pavements is being paid for from current funds. The $15 to $20 million cost will about equal the estimated cost of interest had the first suggestion prevailed. Justly, Mayor D'alesandro and his street officials are proud of their paving accomplishments and the savings they have effected.

Colored Asphalt

British Tests Open Possibility of Bright-Hued Highways

The British Road Research Laboratory is experimenting with cream yellow, red, green and blue asphalt at a cost not very much greater than that of ordinary asphalt, according to an item in the New York *Times*.

Colored asphalts made from pigmented "albino" bitumens have been used for many years but they cost more than ordinary asphalt. Only dark shades can be produced because of the intrinsic darkness of the bitumen.

The new bright colors are made by using a proprietary brand of resinous binder. It is more translucent than albino bitumen, and its cost is said to compare favorably with that of ordinary bitumen. With this binder and a clean white aggregate, such as calcined flint, it is possible to obtain a fine white asphalt which can be easily colored with any desired pigment. The addition of 4% of titanium oxide gives a creamy white. Effective reds and yellow, greens and blues have been made with as little as 2% of other pigments.

The materials have not yet been tested on roads, said this report, but a small area in four colors at the laboratory is giving promising results.

Wellborn Joins Asphalt Institute

Arvin S. Wellborn, formerly with the U.S. Navy, Bureau of Yards and Docks, has been appointed managing engineer of the Pacific Coast Division of The Asphalt Institute with offices in San Francisco, Seattle and Los Angeles.

The territory to be covered by Mr. Wellborn includes the states of Washington, Oregon, California, Arizona and Nevada, and presents a wide variation of climatic and construction conditions. Lee Spencer of the Union Oil Co., and also a Vice President of The Asphalt Institute, heads

the Management Committee for this Division.

Mr. Wellborn was educated at Hendrix College and the University of Arkansas. During the past 16 years, he has had a wide experience in the laboratory control, design, construction and maintenance of highways with the Arkansas Highway Department, and also in industry in the maintenance of asphalt products.

Equipment Distributors Expect Record Meeting

Heavy registration is reported for the 31st Annual Meeting of Associated Equipment Distributors, scheduled for January 15-19, at the Stevens Hotel in Chicago. The meeting is expected to approach the record-breaking total of 1600 distributor and manufacturer members who attended last year's convention.

Heading A.E.D.'s 1950 convention committee is Harry J. Hush of Griffin Equipment Corporation, New York, N.Y., who also chairmanned the 1948 convention and was a member of the '49 committee. Other committee members are S. John Oechsle, Metalweld, Inc., Philadelphia, Pa.; F. J. Fitzpatrick, Parker-Danner Company, Hyde Park, Mass.; and S. F. Laskey, Northwest Equipment, Inc., Fargo, North Dakota.

For the second year, a manufacturers' convention suggestion committee will assist the convention committee in formulating convention plans, including arrangements for a Manufacturer-Distributor Day program, to be held the closing day.

At a recent meeting, Fred Salditt of Harnischfeger Corporation, Milwaukee, Wisc., was elected chairman of this committee for the 1950 Annual Meeting. The eleven other members are: R. K. Stiles, Austin-Western Company, Aurora, Ill., chairman of the first manufacturers' suggestion committee in 1948; C. J. Haring, J. D. Adams Manufacturing Company, Indianapolis, Ind.; J. G. Swain, Waukesha Motor Company, Waukesha, Wis.; Walter D. Holder, Barber-Greene Company, Aurora, Ill.; W. E. Miles, The Oliver Corporation, Cleveland, Ohio; J. C. Campbell, Detroit Diesel Engine Division, General Motors Corporation, Detroit, Mich.; K. E. Brunsdale, Pioneer Engineering Works, Inc., Minneapolis, Minn.; J. H. Yearling, The Jaeger Machine Company, Columbus, Ohio; G. W. Iverson, J. I. Case Company, Racine, Wisc.; S. F. Beatty, Jr., Warner & Swasey Company, Gradall Division, Cleveland, Ohio; John E. Carroll, American Hoist & Derrick Company, St. Paul, Minn.

Asphalt Paving Technologists to Meet in St. Louis

The Association of Asphalt Paving Technologists will hold its annual business meeting Feb. 6-7 at the Statler Hotel, St. Louis, Mo.

An interesting feature of the program is the presentation of papers at the technical session on both days, visitors welcome.

Should Engineer's Estimates Be Public Information?

(*Continued from page* 44)

stances to officially adopt a scientific basis for making an engineer's estimate, since most of these projects employed only state funds. In most cases where a portion of funds for certain projects came from outside sources, such as various bond commissions, or the Public Roads Administration, those bodies have accepted the figures arrived by our new procedure.

Reliable contractors go to considerable expense in looking over the job site, obtaining quotations, and figuring up their bid. Should we not, in justice to them, award the work when their bids are reasonable? The State wishes the projects to be built; otherwise, they would not put the jobs up for bidding. Is not the public entitled to have the work done when the projects save them money in repair bills and operating costs or eliminates lost time due to traffic congestion? When the bid prices are reasonable, in light of present day conditions, we in Connecticut believe the citizens are entitled to have the work awarded and to have the projects actually completed.

Now Carefully Estimated

Since Aug. 19, 1946, all our work has been estimated in a scientific manner. If PRA, or some other agency, insists on theoretical methods, we use both procedures and come to a conclusion after the bids are received. Usually we win out. I believe contractors working in Connecticut realize that we are trying to be fair and reasonable. We have not had the lack of bidders that other states have had. The average bid unit figures we have received are well under those of other states in our federal district. I believe that our tax payers are being served and that contractors are being awarded work at reasonable prices. I should be presumptuous if I made the claim that our method of estimating accounted entirely for the number of bidders we have been fortunate in having, or for the favorable prices which have been quoted; however, I believe that our scientific method has encouraged contractors to continue to bid.

In conclusion, I feel that engineer's estimates should not be public information for the following reasons: first, that in too many cases they are unfair and misleading due to the method employed in making them; second, that they encourage the venturesome, unqualified contractor to bid; and third, that it does not encourage contractors, in general, to thoroughly analyze each project before placing a bid.

Is it not time for highway departments to employ practical experienced estimators and to adopt a fairer and more practical yardstick for making their estimates; for bonding companies to insist that contractors bids are scientifically arrived at by the contractor, or if the surety wishes to carry the business of the irresponsible bidder, that they themselves, employ practical estimators; and for contractors to do a little more scientific estimating and less guesstimating.

Can New Joint Cleaning and Sealing Techniques Reduce Cost of Pavement Maintenance?

(*Continued from page* 41)

weaken the slab in a decreasing amount back from the joint.

The next step in deterioration seems logical; that after the annual cycle of contraction and expansion has taken place for a few years the pavement will have grown enough to cause a blowup. The blowup can be expected at the point where the pavement has been weakened by the cumulative effects of compression strains—at the dirt-filled, neglected crack or joint.

But what happens if remedial steps are taken and the crack or joint is effectively sealed as suggested?

Won't this be a step toward better protection? It should certainly give superior protection against infiltration of water and non-compressible material right from the start; it should do much to prevent serious spalling; it should assure a smoother-riding highway, free of objectionable ridges of extruded seal.

Except for pavements installed without proper drainage, the suggested procedure should help eliminate many of the problems normally associated with joints. Of course, light weight slabs or unstable subsoil conditions could still cause some trouble from pumping or from hydrostatic pressures generated under the pavement. Under some conditions infiltrations may also occur from the sides. But it would appear that by eliminating moisture from entering the joint from the top—assuming proper drainage and a good sub-base—we will have made an important stride towards prolonging pavement life and reducing highway maintenance costs.

●

The Texas Highway Department has announced that a total of 155,000 safety signs have been erected along the present 32,000 mile state highway system. Markers run as high as 20 per mile in dangerous or congested areas, the statewide average being 5 signs per mile.

How to Build a Strong Good Roads Association

(*Continued from page* 37)

tation. Membership blanks are widely disseminated, and a membership certificate for the office wall issued to associate, sustaining and contributing members.

The Association's office receives many calls from citizens asking information on a great variety of subjects. These its office staff try to answer to the best of their ability. Wintertime is bringing an increase in this demand. We are occasionally asked to use our influence to get a particular project included in the 1950 Primary road construction program. Our answer is, "*We cannot do this.* In 1950, the $15,000,000 which the Highway Commission will have available for Primary road construction work will not finance 10% of the work *that is now* urgently needed on Primary roads and their extensions within municipalities. It would be foolhardy for the Good Roads Association to jeopardize its standing with the people throughout the state by becoming advocates of particular projects."

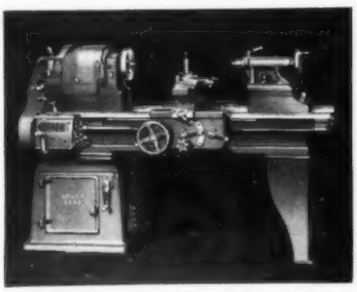
Research into results obtained in other states road funds has been instituted, the Secretary having made a tour with interested associate members to review secondary road stabilization methods in other states.

Bulletins issued from time to time tell members of such activities, and keeps them posted on latest developments in local highway affairs.

New and Improved Construction Products

1
Maintenance Shop Lathe

A lathe that seems to be particularly suited for the maintenance shops of contractors, states, counties and cities has been brought out by the South Bend Lathe Works, 168 E. Madison St., South Bend 22, Ind. This is the new South Bend 16/24 in. swing lathe, which has



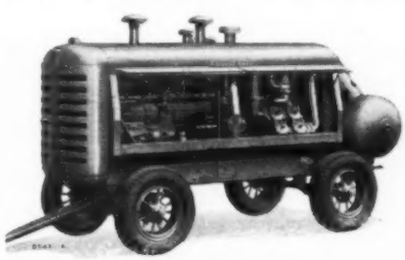
South Bend 16/24 in. Swing Lathe

16 spindle speeds ranging from 11 r.p.m. to 727 r.p.m This wide range of spindle speeds permits machining all work within the capacity of the lathe at efficient cutting speeds. Maximum swing over the carriage is 24¼ in., over saddle cross slide with chip guard is 18¾ in., and over cross slide without chip guard 19¼ in. Distance between centers varies from 30 in. to 102 in. depending on length of bed. Power longitudinal feeds range from .0015 in. to .0841 in., cross-feeds from .0006 in. to .0312 in. Full quick change gear mechanism provides 48 pitches of screw threads ranging from 4 to 224 per inch, right or left hand.

For further information please circle No. 1 on inserted "Quick Help" card and mail.

2
Portable Air Compressor

For users who prefer full diesel-engine drive for their compressors, a new 500 cfm. Mobil-Air has been announced by Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. The engine is the well-known International Harvester heavy-duty UD-24 which starts easily as a low-compression gasoline engine and after a short warmup period is shifted to full diesel operation by means of a single



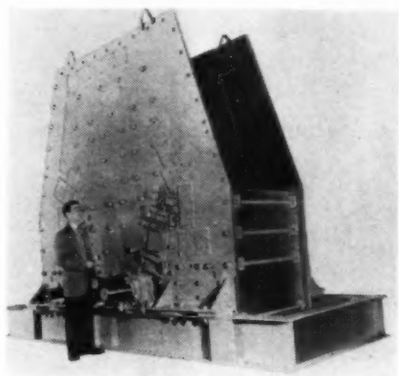
New IKA-500 Mobil-Air

lever. This portable, known as the IKA-500, has all the features used on Ingersoll-Rand's KA-Series Mobil-Air compressors in sizes from 105- to 500-cfm. The new floating-speed regulator slows down the compressor to the lowest practical working speed that compresses just enough air to hold the pressure. Full 500-cfm. capacity is delivered at rated 100 psi pressure. Other features include two-stage Air-cooled compressor, Hydro-shift flex-disc clutch and channel valves.

For further information please circle No. 2 on inserted "Quick Help" card and mail.

3
Rock Crusher for High Production

A new model double impeller breaker has been announced by New Holland Manufacturing Co., Mountville, Pa. This is the fifth model made by the company to produce aggregate through impact in suspension. Capacity of this Model 4040 is stated to be 150 to 250 tons per hour breaking material to 2½ in. and minus in a closed circuit. This is based on average Pennsylvania Blue limestone and will vary depending on the type and characteristics of the material being crushed. Horsepower



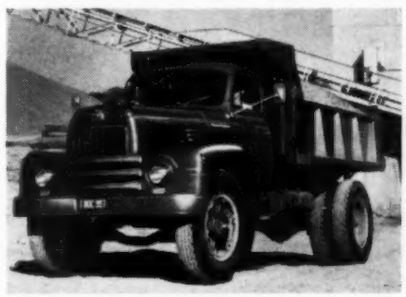
Model 4040 Double Impeller Breaker

required is 150 to 200 (electric) or 220 (diesel). Weighing 65,000 lb., the new breaker is 17 ft. long, stands 11 ft. 6 in. high and is 8 ft. 4 in. wide. Twin impellers each weigh 7929 lb., including three 643-lb. impeller bars with each impeller.

For further information please circle No. 3 on inserted "Quick Help" card and mail.

4
Harvester Trucks Redesigned

A completely re-designed and re-engineered line of International trucks, entirely new from front bumper to tail light, has been announced by the Motor Truck Division of International Harvester Co., Chicago 1, Ill. The new L-line, a complete line of heavy-duty-engineered trucks consists of 87 separate truck chassis models designed to handle every conceivable type of hauling job. The new L-line features: Complete restyling that blends a new modern truck streamlining with extreme practicability. A new "Comfo-Vision" cab, custom-designed to provide more roominess, added comfort and new all-round visibility. New chassis dimension engineering that permits better load distributon, greater maneuverability, shorter over-all lengths and improved engine accessibility. New, improved valve-in-head International truck series engines, including an all-new Silver Diamond engine. And many new mechanical and engineering improvements designed to effect important cost reductions for the operator. The new L-line is spearheaded by four classifications of four-wheel model trucks—the Standard,



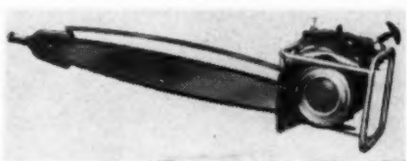
Loadster Truck Model L-204. This Model Has Gross Weight of 29,500 lb.

ranging from 4200 lb. to 40,000 lb. gross vehicle weight; the Schoolmaster, comprising five bus models ranging from 12,500 to 24,000 lb GVW; the Loadstar, ranging from 16,500 to 29,500 lb, GVW; and the Roadliner, ranging from 16,000 to 30,000 lb, GVW. The new International line further features new Metro multi-stop units, product of the company's Bridgeport, Conn., plant, ranging from 5300 to 10,000 lb, GVW, and including three different body sizes, one adaptable for use as a bus; a new group of six-wheel chassis units, ranging from 22,000 to 50,000 lb, GVW; a new group of cab-forward chassis units, ranging from 14,000 lb, GVW. The company's "West Coast" trucks, manufactured in International's Emeryville, Calif., plant, include two highway and four off-highway vehicles, ranging from 30,000 to 90,000 lb, GVW.

For further information please circle No. 4 on inserted "Quick Help" card and mail.

5
Chain Saw

A new 36-in. gasoline-driven chain saw, now in production by Reed-Prentice Corp., Dept. H-28, Worcester 4, Massachusetts, U.S.A., is stated to be especially designed for rapid and efficient



New Timberhog "36"

cutting of heavy timber by contractors, lumbermen and others. Powered by a two-cycle, 4.2 h.p. engine, this two-man saw features an anti-friction ball-bearing idler at the helper's end which provides greater use of the horsepower pro-

duced and insures faster cutting. Complete with guide bar, chain, guard, and helper's end, this 36 in. saw weighs only 65 lb. A diaphragm-type carburetor enables the engine to operate in any position without stalling, thus eliminating the need for any bothersome blade-swiveling mechanism.

For further information please circle No. 5 on inserted "Quick Help" card and mail.

6

Fluorescent Street Lights

Post-Lites, a new outdoor all-weather fluorescents, produced by W. H. Long Co., Chicago, Ill., are reported to double the usable light of mercury street lights and give four times the usable light of incandescents. The "Radiant" light of

Post-Lites, the New Outdoor Fluorescents

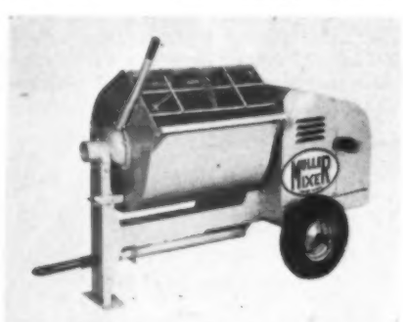
Post-Lites fans out horizontally, utilizing its output where it is wanted—at the level of use. As no light-posts are needed, old-light-posts regardless of type can be converted with single Lites or cluster Lites of lamp-type models. For new installations, 2 in. pipe set in concrete is the only base construction required. Operates 110V-120V. Post-Lites have proved efficient under 40° below zero temperatures and have withstood all storms including tornado.

For further information please circle No. 6 on inserted "Quick Help" card and mail.

7

Mortar Mixer

A new 3 cu. ft. plaster and mortar mixer, announced by Muller Machinery Co., Metuchen, N.J., has a charging height of 32 in. and a width of 29½ in., making it particularly convenient for inside use, as it goes through a 30 in.



Muller 3 Cu. Ft. Mixer

doorway without altering wheels. Powered by a Model 9-R-6 Briggs and Stratton air-cooled engine it is driven through a roller chain and machine cut gears. Engine House is split for accessibility to driving mechanism. Tires are 4.00x8 on disc wheels with roller bearings. Also supplied with a 1 h.p. electric motor for plugging in a light socket for inside use.

For further information please circle No. 7 on inserted "Quick Help" card and mail.

8

New Leaf Collector

A new leaf collector for streets and highways, invented and designed by Harry Clemens, La Porte, Ind., and marketed nationally by Willard Simcox, La Porte,

Leaf Collector

Ind., mounts on a standard Ford tractor. It has all self-aligning pressure lubricated bearings, Dodge multi-grooved sheaves and shafting, New York blower of the material-handling type, overhead hydraulically-dumped hopper capable of handling a half ton or more of leaves, a spring-lifted front ventura with rotating agitator for wet leaves and heavy duty Dodge clutch.

For further information please circle No. 8 on inserted "Quick Help" card and mail.

9

Gasoline Engines With Many New Features

Three new 4-cylinder gasoline power units, the Models JX4E, JX4C and JX4D, have been added to the line of Hercules Motors Corporation, Canton, O. The Model JX4E has a 3½ in. bore x 4¼ in. stroke and 164 cu. in. displacement; JX4C, 3¾ in. bore x 4¼ in. stroke and 188 cu. in. displacement and JX4D, 4 in. bore x 4¼ in. stroke and 214

Hercules Series JX4 Power Unit

cu. in. displacement. The new models follow definite standards of design and construction established by Hercules as practical in meeting the severe service to which these power units are subjected. They are equipped with five main bearings and the crankshaft is counterbalanced for double assurance of smooth, vibrationless operation, and to reduce bearing loads. The crankshaft is also Tocco hardened to permit the use of bearing metals of relatively hard and long life. The high turbulence design of the combustion chambers in the cylinder head provide maximum power delivery and operating economy. Exhaust valves have austenitic heads welded to hardened nickle steel stems.

For further information please circle No. 9 on inserted "Quick Help" card and mail.

10

Ford Truck Line Expanded

Engineering changes incorporated in Ford trucks in the 18 months following the introduction of the current series have resulted in steady expansion of the line. The changes permit better adaptation of the trucks to a wider range of operation. Included among some of the more important items are: Availability of air brakes on 21,500 gross vehicle weight rating F-8 series, the largest Ford trucks ever built. These brakes will be provided as optional equipment. Heavy duty three-speed transmissions as optional equipment for F-1, F-2 and F-3 series Ford trucks. Ratios of these transmissions are: low gear, 3.714; second gear, 1.871; third gear, direct; reverse, 4.588.

A 176-in. wheelbase model has been added for the F-5 and F-6 series. The

New and Improved Products

Reported in this issue

F-7 and F-8 series have additional wheelbase lengths of 147 and 178 in. F-7 series trucks are now equipped with dual cylinder type 15 in. x 5 in. rear brakes. The 145 hp. engines in both F-7 and F-8 series now have new type exhaust valves which are free to rotate in the valve guides

Series F-6 Ford Truck Equipped with Dump Body. Maximum Gross Vehicle Rating Is 15,500 lb.

when valves are lifted, aiding in proper seating and tending to prevent the formation of deposits on valve stems and in valve guides. A new camshaft and new solid adjustable tappets also have been installed. Single speed rear axles are now available for series F-6 and F-8 models. The maximum gross vehicle weight rating of 15,500 and 16,000 lb. for the F-6 conventional and cab-over-engine models and 21,500 lb. for the F-8 series remains the same with either single or two-speed axles.

For further information please circle No. 10 on inserted "Quick Help" card and mail.

11
Crane Block Permits Higher Lift

A new Lo-Head crane block, in capacities from 10 to 50 tons, announced by American Hoist and Derrick Co., St. Paul 1, Minn., with its shorter overall length, permits 1½ to 2 ft. higher lifts without lengthening the boom. The forged hook operates on Timken tapered roller bearings and the cast steel sheaves are equipped with Hyatt Hi-Load bearings. Lubrication is necessary only once each 2,000 hours. Alemite fittings are provided for standard grease gun use.

For further information please circle No. 11 on inserted "Quick Help" card and mail.

12
Small Tandem Roller

A new small roller designed especially for asphalt road patching, and usable for sidewalks for compaction of small areas of sod, lawn or soil, is being manufactured by Gabb Manufacturing Company, East Hartford 8, Connecticut. The roller weighs 265 lb. empty and 600 lb. fully loaded with water ballast. Powered by a 1½-hp. Briggs & Stratton motor; has a width of 29½ in. Mechanical features include heavy welded and bolted frame, extra heavy rolls, load concentration on main roll. Ease of operation in tight corners and easy loading onto trucks are operating features; turns in 3-ft. radius.

For further information please circle No. 12 on inserted "Quick Help" card and mail.

13
Convertible Hydro-Crane

A new hydro-crane, announced by Stratton Equipment Co., Hanna Bldg., Cleveland 15, O., has three applications: (1) a hydraulic, portable floor crane; (2) a truck loading hydro-crane; (3) a crane for tow truck service. The active operating mechanism, including the pump, control valve and hydraulic are mounted as a unit on a sturdy mast. This operating mast fits into a heavy-duty steel sleeve mounted in the bed of the truck and rigidly anchored to the frame and cross members. This permits a complete 360° turning operation. Loads can be handled on each side or back of the truck body. The operating mast can be locked in any desired position with a convenient foot brake; when used as a tow crane the only additional requirements are the towing guide rods and floating bar. Almost instant conversion can be made to a tow crane, truck loading and unloading crane or back to a floor crane.

Stratton 3-Way Model Hydro-Crane

For further information please circle No. 13 on inserted "Quick Help" card and mail.

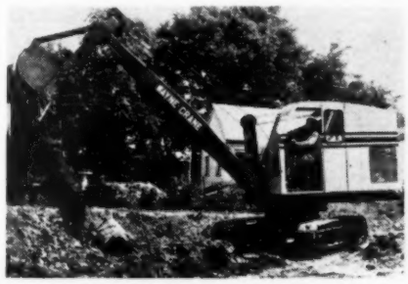
14
Trailer Has Gooseneck Ramp

A new development to the line of "Carryhaul" trailers of the Martin Machine Co., Kewanee, Ill., is a patented folding gooseneck, which, when lowered to the ground, forms a loading ramp, providing a uniform incline from the ground to the trailer platform. When the trailer is loaded, a power-operated winch on the truck-tractor raises the gooseneck to towing position. The entire procedure is a one-man operation. An additional feature of this trailer is the patented tandem axle assembly which is completely suspended in rubber for flexibility and independent wheel action. This assembly has no grease fittings, requires no lubrication, and has no pins or bushings to be replaced. The trailer will be available in capacities up to 100 tons.

For further information please circle No. 14 on inserted "Quick Help" card and mail.

15
Crane-Excavator

A new ½ yd. crawler-mounted excavator, the Model 66, announced by the Wayne Crane Division of the American Steel Dredge Co., Fort Wayne, Ind., is easily convertible to shovel, dragline, clamshell and a magnet or 7½-ton utility crane. The new crawler assembly was designed especially for this machine and is built complete in the Wayne Crane plant. It is powered through direct drive propeller shaft assembly from the new "direct power flow" transmission. The bearing length of the crawler is 8 ft. 5 in. with a width of 8 ft. The upper works of the model 66 is enclosed in a weatherproof, inside bolted cab of a new design which permits inside access to all deck machinery. The new excavator has an all-welded chassis and travels, lifts, booms and swings simultaneously or independently. The swing speed is 6.2 r.p.m. Standard power unit for the Model 66 is a 6-cylinder gasoline engine which develops 62 h.p. at 1800 r.p.m.

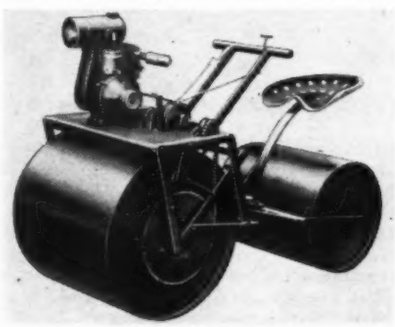


Model 66 As Trench Hoe

For further information please circle No. 15 on inserted "Quick Help" card and mail.

16
Dipper Trip

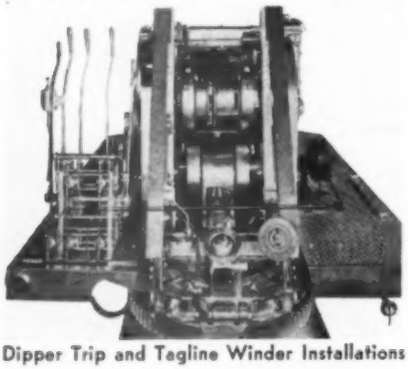
A combination power dipper trip and automatic tagline winder have been added to the shovel of the "Quickway" Truck Shovel Co., Denver, Colo. Advantages stated to result from use of the attachment as a tagline winder are: accurate loading and casting without moving boom or machine automatic tagline pull, uniform, adjustable pull at and be-



Tandem Motoroller

"Caterpillar" Motor Grader Mounting New Martin Folding Gooseneck Trailer

low machine level, instant acting manual control to manipulate clamshell or grapple. As a power dipper trip for shovel and scoop attachments, this optional equipment also saves time and operator



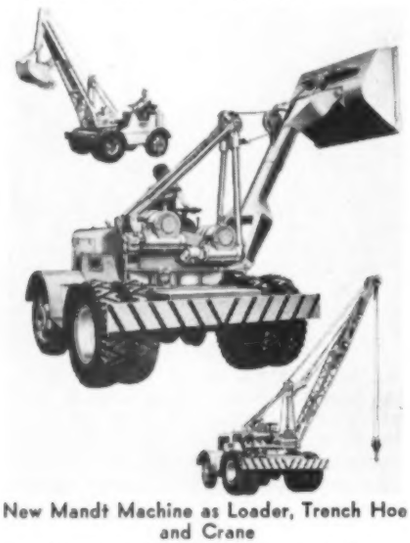
Dipper Trip and Tagline Winder Installations

effort, resulting in more work done per day. The unit is quickly installed inside the "Quick-Way" cab, requiring no major changes. In addition to protecting the power dipper trip and automatic tagline winder from weather, this installation avoids placing extra weight on the boom.

For further information please circle No. 16 on inserted "Quick Help" card and mail.

17
New Convertible Loader

A new loader announced by The Mandt Mfg. Co., Columbus, O., features full hydraulic operation, 180° swing and quick change convertibility to mobile crane or backhoe. The loader is now available through leading construction distributors coast to coast. As a loader, the unit is designed for standard ¾ yd. material bucket and up to 2 yd. snow handling bucket. It is



New Mandt Machine as Loader, Trench Hoe and Crane

capable of loading from any point in a 10 ft. wide swath and also above grade and can swing 90° to either side to dump, permitting work within 2 ft. of trucks. The main weight of the machine and all the leverage of its load are centered on the 4 driven front wheels of maximum traction and crowding power. Bucket is provided with power dump and return. The loader is quickly converted to an excavator and trencher by installation of ⅛ yd. backhoe attachment in place of loader, or to a mobile 3-ton crane operating boom of 10 to 23 ft. length which can be swung 180° without outriggers to pick up or place loads. Traction speeds range from low-low gear for digging into tough materials to 15 m.p.h. for yard crane work and self-transportation over roads and city streets.

For further information please circle No. 17 on inserted "Quick Help" card and mail.

18
2-yd. Excavator

A new 2-yd. power shovel, the 51-B, has been announced by Bucyrus-Erie Co., South Milwaukee, Wis. The 51-B is convertible in the field for crane, dragline, clamshell or shovel service. The single unit inside dipper handle of the new 51-B is similar to other of the company's machines including their 36 yd. 1050-B stripping shovel. The twin-rope crowd is fully independent of hoist. Full engine power may be applied to the crowd if necessary. Direct mechanical control of crowd, hoist and swing gives an exceptionally fast digging cycle. For dragline and clamshell service, booms from 50 to 90 ft. in length are available. Crane booms may be purchased up to 110 ft. in

The 51-B in Dragline Service

length. Additional reach for the lifting crane may be provided by using one of several jib extensions available for the 51-B. Contractors may choose diesel or electric power in the new 51-B. Main hoist, swing, boom hoist, crowd and retract machinery operate on anti-friction bearings. Clutches under direct, instantaneous mechanical control have single point adjustment for wear—and adjust themselves automatically for weather and temperature conditions.

For further information please circle No. 18 on inserted "Quick Help" card and mail.

19
Improved Snow Plow Wax

Development of an improved grade of Penn Drake snow plow wax has been announced by Pennsylvania Refining Co., Cleveland, O. Easily applied with either paint brush or spray gun, the new wax is stated to provide a heavier and longer lasting slippery coat for the working surfaces of snow removal equipment. The tough wax coating is said to be up to 50% thicker than formerly provided and with correspondingly longer service life.

For further information please circle No. 19 on inserted "Quick Help" card and mail.

20
Rock Drill Bit for Lower Drilling Costs

A new type of rock drilling bit which is expected to offer unequalled advantages for many drilling conditions has been announced by The Timken Roller Bearing Co., Canton, O. Known as the One-use "Spiralock" bit, the bit has been designed to provide economies that have not been possible in the past. It is intended primarily for use where bit reconditioning is impractical or undesirable and is designed for fast drilling at low cost. The new bit is said to offer more advantages than any other rock bit of the One-use type. It has a revolutionary "Spiralock" attachment, the superiority of which has been proved under actual on-the-job conditions. Among the more important features of the bit are: Ease of putting on and taking off! Stays on more dependably! The new bit has a square socket that spirals slightly as it recedes, forming the "Spiralock" union that prevents the bit coming off the steel in the hole. Non-choking back

Timken "Spiralock" Bit

face! The back face of the "Spiralock" bit is scalloped and rounded off to prevent chips packing behind the bit. Non-rifling! The "X" cutting edge of the "Spiralock" bit prevents rifling in any ground. Simplifies preparation of drill steels! Due to the "Spiralock" union steels last much longer—are easier to prepare and recondition. Square steel ends simplify fitting. They can be machined or forged. Any steels can be used! Existing drill steels of any size and section can be easily and quickly adapted to the One-use "Spiralock" Timken rock bit. Crowned chisel pilot! Easier starting and centering. The new Timken "Spiralock" bit is made of Timken electric furnace steel for fast cutting, long lasting, uniform quality.

For further information please circle No. 20 on inserted "Quick Help" card and mail.

21
Power Scythe

An easy-to-handle, portable power-driven scythe, announced by Hoffco, Inc., Richmond, Ind., is especially designed to reach those "hard to get at" places, such as around traffic signs and guard rails. Its portability permits the operator to trim high slopes and rough rock terrain. The unit weighs 24 lb. A 1¼ h.p. 2-cycle engine activates 2 in. wide precision ground cutting blades through an aluminum torque tube.

For further information please circle No. 21 on inserted "Quick Help" card and mail.

22
175-hp. Diesel Engines

Two new six-cylinder, highspeed diesel engine models designed for on-highway and off-highway automotive applications have been placed in production by the Cummins Engine Co., Inc., Columbus, Ind. Both the HRBB-600 (highway) and HRBBI-600 (off-highway) models have a maximum rating of 175 hp at 2,000 rpm. They are specifically designed for use on automotive applications where there is a need for the flexibility of higher rota-

tive speeds and the performance of higher horsepower. Features of the two new engines are: (1) Fully counterbalanced crankshaft. (2) Camshaft of new design. (3) Viscous-type torsional vibration damper. (4) Revised fuel pump. Both the HRBB-600 and the HRBBI-600 have a piston displacement of 743 cu. in., a 5½-in. bore, and 6-in. stroke. These two models are supplied with the following standard equipment: air cleaner, oil-bath type (unmounted); electrical equipment — 12/24-volt, 700-watt; flywheel housing, SAE No. 2 with SAE No. 3 arms; exclusive Cummins fuel pump; fuel oil filter; fuel oil pressure gauge (unmounted) governor; lubricating oil pressure gauge (unmounted); lubricating oil strainer, full-flow type; thermostats, with main and by-pass flow control.

For further information please circle No. 22 on inserted "Quick Help" card and mail.

23

Truck Body

A new hopper type truck body designed to haul about 26 tons of coal has been designed by Marion Metal Products Co., Marion, O. Four of these new large

35 Cu. Yd. Truck Body

capacity bodies were recently delivered to the West Virginia Coal and Transportation Co. This new Marion hopper body has a capacity of 35 cu. yd. Inside dimensions are 26 ft. long and 90 in. wide. The air-operated hopper doors are 8 ft. long and 3 ft. wide, and are unlatched and closed by controls in the truck cab.

For further information please circle No. 23 on inserted "Quick Help" card and mail.

24

New Dodge Trucks Have Money Saving Features

A new and expanded line of trucks comprising 356 basic gross vehicle weight models has been announced by the Dodge Division, Chrysler Corporation, Detroit, Mich. The Dodge "Job-Rated" truck line now ranges from 4250 to 23,000 lb. gross vehicle weight and up to 40,000 lb. gross combination weight. Nominal ratings have been increased to include some 2¾ and 3½-ton models. Among the many new features announced

VA-130 Model with Rating of 23,000 lb. Gross Vehicle Weight and 40,000 lb. Gross Combination Weight

on the new B-2 Series are: an electrical system which assists in improving engine performance, a new 5-speed synchro-shift transmission, a new 5-speed synchro-shift overdrive transmission, cyclebonded brake linings as standard equipment on all models, and a steering column gear-shift and a convenient hand brake under the center of the cowl on ½, ¾ and 1-ton models. One completely new engine is among the seven offered in the new line. Fourteen new models have been added to the 1½-ton group to broaden the Dodge coverage in that group to 92 GVW options. Dodge now offiers three basic models in the 1½-ton group ranging from 7,000 to 16,250 lb. in seven different wheel bases.

For further information please circle No. 24 on inserted "Quick Help" card and mail.

25

Cable Load Limit Switch

An instrument for operating an electric switch when the cable tension reaches a predetermined value has been placed on the market by Martin-Decker Corporation, 3431 Cherry Ave., Long Beach 7, Calif. It may be applied to any wire cable from ¼ in. to ¾ in. in diameter without cutting or removing the cable. An alloy steel heat-treated rectangular beam is clamped on the cable, and an offset is placed in the cable which deflects the beam so that the loading will operate the switch. In order to set the switch at any predetermined load, an adjusting screw is provided; and also, an auxiliary stud is provided for sealing the switch when used as a limited device by safety departments or crane engineers. The load setting can be any value from 500 to 25,000 lb. single-line pull.

For further information please circle No. 25 on inserted "Quick Help" card and mail.

26

Long Lasting Air Hose

An improved Type 22 air hose, with the tube and rubber made of oil-proof rubber compounds, has been announced by The B. F. Goodrich Co., Akron, O. Three-ply fabric reinforcement and dimensions of the Type 22 continue the same. The hose is made with a smooth finish red cover with extra toughness to resist weathering and sun checking. Strong adhesion of cover to the carcass enables the hose to withstand repeated bending and flexing with less danger of separation. The hose is made in ¼ in., $\frac{5}{16}$ in. and ⅜ in. sizes. Outside diameters are respectively ½, $\frac{9}{16}$ and 21/32 in., and weight per 100 ft. 10.3, 12.2 and 15.1 lb. The two smaller sizes withstand 150 lb. working pressure, the larger, 125 lb.

For further information please circle No. 26 on inserted "Quick Help" card and mail.

27

Drawing Board

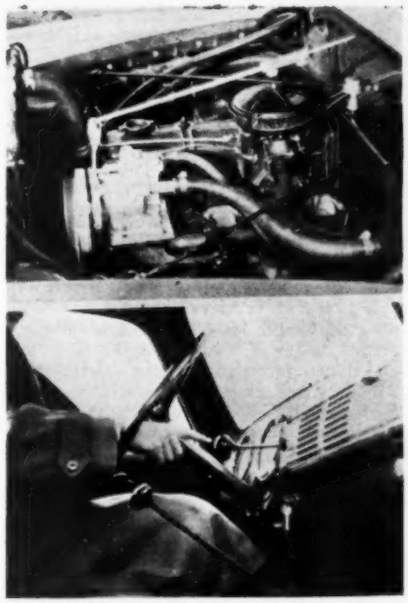
A new drawing board announced by Cal-Pan Corporation, Alhambra, Calif., is stated to have the lightness and strength of air-cell type construction. This new board incorporates the following construction features: Honeycomb, or air-cell type, design of core cuts weight by two-thirds. The combination of top and bottom panels, framework and honeycomb, with wood grain running in different directions, makes the strongest panel design possible. All elements—framework, honeycomb, top and bottom panels—are bonded into one permanent, rigid unit with waterproof glue.

For further information please circle No. 27 on inserted "Quick Help" card and mail.

28

Controls for Snow Plows

A new hydraulic control for snowplows, announced by National Truck Equipment Co., 225 Madison St., Dept. SPK-38, Wauk-



National Snowplow kit Installed on Truck

esha, Wis., uses a compact hydraulic pump with its own all-metal clutch. The pump operates only when power is needed. One finger-tip control knob on the dash raises the plow (engaging the clutch), holds the plow and lowers the plow (operating the slide valve). The pump is mounted under the hood and operates off the fan belt. Installation of the kit is simple.

For further information please circle No. 28 on inserted "Quick Help" card and mail.

29

Trailer-Type Back Hoe

A trailer type hydraulically operated back hoe, announced by the Badger Machine Co., Winona, Minn., can, it is stated, be attached to any type of tractor equipped with power take-off, within 60 seconds. The power take-off furnishes the power to operate the ditcher. The

Hopto Digger

machine has a swing of 180°, and is claimed to excavate 100 ft. of 4 ft. trench hourly. For digging manholes or well pits, it is stated, it will handle 25 yd. per hour. For further information please circle No. 29 on inserted "Quick Help" card and mail.

30

Jetting Pump

A new model self-priming jetting pump, HP 150, announced by Sterling Machinery Corporation, Kansas City, Mo., is stated to have a capacity of 400 gal. per minute at 150 lb. pressure, This new pump is primed by engine exhaust, a device which primes the pump

rapidly (naturally dependent upon the suction lift). High efficiency is claimed as a characteristic of this jetting pump. Sterling self-priming jetting pumps are available both in single-stage models and multi-stage models.

For further information please circle No. 30 on inserted "Quick Help" card and mail.

31
Mobile 25-Ton Crane

A 25-ton capacity rubber tire mounted crane has been added to the line of Bay City Shovels, Inc., Bay City, Mich. With two types of carriers the crane is available as Model 190-T61 CraneMobile and Model 190 CW CraneWagon. The first mentioned is mounted on a specially designed, three axle crane carrier, powered by a separate heavy-duty 779 cu. in. displacement, automotive type gasoline engine, and equipped with 10 12.00x20 tires and Timken tandem rear axle unit with through worm drive. Main and auxiliary transmission provides 12 forward speeds

Model 190 CW CraneWagon

up to 35 m.p.h., and three reverse speeds. The 190 CW CraneWagon is a self-propelled one-engine crane, mounted on a 6-wheel carrier equipped with 12 12:00x20 tires. The crane machinery or upper works of the 190-T61 CraneMobile and 190CW CraneWagon is powered by a heavy-duty 517 cu. in. displacement industrial type gasoline engine. Engine, machinery and A-frame supports are mounted on a full-length one-piece unit-cast alloy-steel rotating base or bed plate to maintain rigid alignment. Hoist and auxiliary hoist drums are ball-bearing mounted on separate shafts. Power is transmitted through quiet, smooth running helical gears and wide external-contracting band type clutches.

For further information please circle No. 31 on inserted "Quick Help" card and mail.

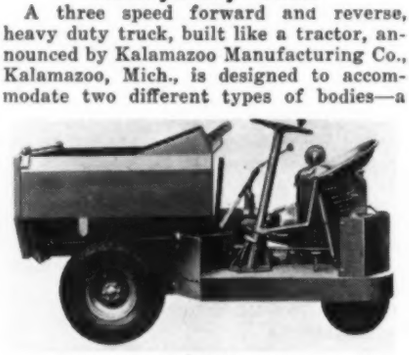
32
Plastic Traffic Line Markers

Street markers made of plastic molded in 4½ in. disks have been placed on the market by the Traffic Safety Supply Co., Portland, Ore. The markers are adaptable to both concrete and asphalt pavement and are applied swiftly by means of a special adhesive and an easily installed metal pin. On asphalt they are applied with hot mastic adhesive at intervals, twisted firmly into the mastic and secured by driving a 2-in. pin through the marker into the asphalt. No drilling is necessary. On concrete, installations are identical except a ¼-in. hole, ⅝ in. deep is drilled in the marker and a 1-in. pin is used to secure the disk to the pavement.

For further information please circle No. 32 on inserted "Quick Help" card and mail.

33
Heavy-Duty Truck

A three speed forward and reverse, heavy duty truck, built like a tractor, announced by Kalamazoo Manufacturing Co., Kalamazoo, Mich., is designed to accommodate two different types of bodies—a



Kal-Truk

⅔ yd. dump body and an all-steel platform body. The dump body is standard equipment and the platform body is available as extra equipment. The unit has a wheel base of only 56 in., with front tread of 34½ in., and rear tread of 10 in. Overall dimensions with either the dump body or platform body with side and end gates on, are: 85½ in. long overall; 41¾ in. from ground to top of box; 42 in. wide overall; 50¼ in. high overall; and ground clearance of 7½ in. Shipping weight approximates 1,300 lbs.

For further information please circle No. 33 on inserted "Quick Help" card and mail.

34
Poison Ivy Control

An effective means of combating poison ivy and poison oak has been discovered by The Millburn Co., Detroit, Mich. One of the eastern states called in the company, manufacturers of a line of dermatitis preventative creams and liquids, to aid their highway department in combating the high incidence of poisoning which happened every summer among their employees. It was soon found that the exposed skin could be made immune to the oil of the ivy leaves which causes the irritation by application of a Ply liquid before starting work. This liquid is greaseless and will last for six to eight hours if the skin is not washed. At the end of the day washing with soap and water quickly removes the protective coating. A booklet on poison ivy control is available.

For further information please circle No. 34 on inserted "Quick Help" card and mail.

35
Safety Warning Device for Cranes

A newly designed safety warning device for preventing accidents when cranes are working in congested areas has been announced by Electric-Alarm Sales Co., Dept. 6, 320 WOW Building, Omaha 2, Neb. This Electro-Alarm Proximity Warning Device fits any rig, and sounds a loud warning signal each time the boom swings into the vicinity of danger. The electronic system used is doubly-protected from internal or external breakdown and instantly indicates any failure by flashing a red light in front of the operator. Once turned on, the device works automatically yet allows for manual control of proximity. At 75 ft. it can detect and warn the operator of danger in the 10,000 volt range. It is sensitive to voltages from 110 up, and allows proximity warnings from 4 to 200 ft. Rain, ice and sleet do not interfere with its use. It is particularly desirable for night work or where power lines are in a line between the operator and the sun.

For further information please circle No. 35 on inserted "Quick Help" card and mail.

36
Four-Wheel Kits

Four-wheel (front and rear axle) units in kit form, designed to provide portability to a wide range of construction equipment, have been announced by The United Manufacturing Co., Bedford, O. A complete kit consists of two axles, four automotive-type wheels with hub assemblies, bearings, four spring assemblies, draw bar and hitch, brakes (automatic brake control when specified), and spring mounting brackets for either side-frame or under-frame installation. The assemblies can be furnished having capacities ranging from 1000 to more than 12,000 lbs.

For further information please circle No. 36 on inserted "Quick Help" card and mail.

37
Wire Rope and Rod Cutter

A portable hydraulic hand tool, with shear-type cutting blade stated to be capable of cutting wire rope up to 1¼ in. and mild steel rod up to ¾ in., has been placed on the market by Manco Mfg. Co., Bradley, Ill. This tool can also be obtained with special center-cut blades for rod only, which will cut ¾ in. reinforcing and 1 in. mild steel. The tool can also be adapted

Manco "Guillotine" Cutter

to perform crimping, swedging, and bending operations on large-diameter material. Heavy-duty design features special forgings and high-tensile steel castings, yet the unit weighs only 40 lb. for easy portability. The tool operates by hand pumping, using the operator's weight not strength to make the cut.

For further information please circle No. 37 on inserted "Quick Help" card and mail.

38
Sinker Drill

A new 45-lb. class sinker of advanced design, has been announced by Gardner-Denver Co., Quincy, Ill. Designed for either wet or dry drilling, this S48 can be changed from wet to dry or to automatic air-operated water control merely by changing the easily removed gland and tube. The conversion is made without taking the drill apart, and without changing the backhead. An improved steel puller on the S48 has no nuts to work loose, can be

swung clear of the chuck when desired. A new type water connection swivels freely, yet is said to have a leak-proof water seal. The air cleaning screen is designed to clean itself during blowing.

For further information please circle No. 38 on inserted "Quick Help" card and mail.

39
Impactor Easily Operated

Numerous mechanical improvements as well as increased performance are stated to be offered in the latest model Wayer impactor of the Wayer Impactor Sales Co., Columbus, O. Tamping impact has been increased to 1250 foot pounds delivered at a speed of 1900 blows per minute. New self-priming, constant speed carburetor, flexible break-proof gas line, heavy duty fuel tank, anchored bolts and screws, long-life shock absorbers and more efficient

Model 25-c Wayer Impactor

heating of the tamping-finishing plate are now provided. The machine is self-propelled and is stated to be capable of tamping and smoothly finishing 60 to 80 sq. ft. per minute. Compact size and an overall weight of 240 lb. permit the impactor to be carried in light trucks. It is operated by common labor and has an average consumption of 1 gal. of fuel a day.

For further information please circle No. 39 on inserted "Quick Help" card and mail.

MANUFACTURERS' LITERATURE

40
Membrane Concrete Curing Compounds

A new illustrated bulletin describing Permite membrane concrete curing compounds has been published by Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O. The bulletin announces the development of two compounds; Permite V-167, for all horizontal concrete surfaces and for vertical surfaces below ground; Permite V-169, for all vertical concrete surfaces where non-discoloration is an important factor. The compounds are applied to the concrete surface by spraying, and are claimed to form an impervious film which seals in the mixing water for proper curing. Description of technical features, methods of application and a testing laboratory report, showing results achieved by both compounds in meeting specifications established by U. S. Army Corps of Engineers, are included in the data.

For further information please circle No. 40 on inserted "Quick Help" card and mail.

41
Soil Conservation

A new booklet issued by International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill., presents a report on latest techniques and tools used to meet the problems of erosion, invading brush and expanding irrigation activities wth tractors and other industrial machines. Action photos of International tractors on the job, illustrate various operations involved in soil saving. Clearing, raking, chopping, chain dragging and deep-plowing mesquite and other woody growths; building terrace-and-waterway protective systems; levelling and grading land for irrigation, and other phases of the work are shown. Brief captions give job details, costs and owner reports of tractor performance.

For further information please circle No. 41 on inserted "Quick Help" card and mail.

42
Special Alloy Steel

A new special alloy steel, Jalloy, described in a 36-page brochure issued by Jones & Laughlin Steel Corporation, Pittsburgh 30, Pa., is being used in the earth moving, mining, and quarrying industries with outstanding success where abrasion and impact resistance are major factors in the service life of steel. The booklet features a complete presentation of Jalloy case histories in these various fields. Also included in the booklet is complete technical data with tables on chemical composition, grain size, and various physical properties relating to surface hardness, yield strength, etc.

For further information please circle No. 42 on inserted "Quick Help" card and mail.

43
Aerial Mapping

Basic principles of modern techniques employed in producing aerial topographic maps are explained in a new brochure, "Wings for the Transit", published by Lockwood, Kessler & Bartlett, Inc., 32 Court St., Brooklyn 2, N. Y. Profusely illustrated with striking photographs, this publication reveals various stages in the preparation of accurate maps from precision aerial photographs. It also exhibits, samples of these photographs stereoscopic pairs, mosaics, and photogrammetric maps drawn with the aid of precise stereo-plotting instruments.

For further information please circle No. 43 on inserted "Quick Help" card and mail.

44
Rock Breakers

A new 16-page catalog describing its five models of Double Impeller Breakers has just been published by New Holland Manufacturing Co., Mountville, Pa. A four-page section is devoted to a description of the principle of dual impact action and how it is built into the double impeller breakers. Cutaway drawings show how stone is reduced to desired sizes by impact in suspension with twin whirling impellers inside the breaking chamber. Photographs of installations appear in another section describing each of the Models 1212, 2020, 3030, 4040 and 5050. Model numbers refer to the maximum size stone (inches square) each model will handle. Another section illustrates the double impeller breaker installed as skid-mounted units and as part of one and two-unit semi-portable and portable crushing and screening plants.

For further information please circle No. 44 on inserted "Quick Help" card and mail.

45
Corrosion-Resisting Wire Rope

133 different sizes and types of stainless steel and monel metal wire ropes are catalogued in a new folder released by Macwhyte Co., Kenosha, Wis. Typical uses for each rope are listed and the various types available are described and illustrated.

For further information please circle No. 45 on inserted "Quick Help" card and mail.

46
Ditcher

A new 8-page bulletin on its Buckeye Model 306 utility ditcher has been issued by the Findlay Division of Gar Wood Industries, Inc., Findlay, O. The bulletin emphasizes the many features in the Model 306 and lists the varied applications.

For further information please circle No. 46 on inserted "Quick Help" card and mail.

47
Welding

Complete data on several new products are presented for the first time in a revised edition, just published, of the 32-page, pocket-size combination low-temperature welding handbook and catalog offered by All-State Welding Alloys Co., Inc., of 273 Ferris Ave., White Plains, N.Y. This illustrated booklet lists all the All-State rods and fluxes, including several new items. It contains tables of characteristics, full application information, and helpful hints of general interest to workers in the metal-joining industries.

For further information please circle No. 47 on inserted "Quick Help" card and mail.

48
Clay Liner Plates

A new 6-page pamphlet dealing with the proper installation of vitrified clay liner plates has been released by The Robinson Clay Product Co., Akron 9, O. Joining, bonding and anchoring of clay liner plates for concrete pipe and masonry sewers, drains, sewage treatment tanks and other projects are discussed in detail.

For further information please circle No. 48 on inserted "Quick Help" card and mail.

49
Motor Graders

A 31-page booklet published by Caterpillar Tractor Co., Peoria 8, Ill., provides illustrations and data on the company's three models, 100 h.p. No. 12, the 70 h.p. No. 112 and the 50 h.p. No. 212. Included are engine cutaway pictures and close-up views of different parts and attachments on these units

For further information please circle No. 49 on inserted "Quick Help" card and mail.

50
Diesel Engines

Two new bulletins containing complete specifications of all automotive and industrial models of HR-600 and HRS-600 Cummins diesels have been announced

by the Cummins Engine Co., Inc., Columbus, Ind. These four-cycle, six-cylinder Cummins diesels have a 5⅛ in. x 6 in. bore and stroke, and a piston displacement of 743 cu. in. The naturally aspirated HR-600 develops a maximum of 165 h.p. at 1800 r.p.m., and is available in six models. The supercharged HRS-600 Cummins diesel is offered in five models. Each bulletin includes general specifications, a list of standard equipment for each model, together with optional equipment. The bulletins are illustrated with installation drawings and photographs of the various models, plus drawings illustrating torque, horsepower and fuel consumption curves.

For further information please circle No. 50 on inserted "Quick Help" card and mail.

51
Shovel and Crusher Parts

Bulletin 1049 issued by Kensington Steel Co., Chicago, Ill., illustrates and describes wearing parts for power shovels and crushers of Oro alloyed manganese steels. It points out which particular alloyed manganese steel renders maximum service for a specific application, such as crawler treads, dipper teeth and crusher jaws. Also described in detail is the Quad-Edge renewable tip pulverizer hammer which permits tips to be replaced when worn instead of discarding the entire hammer.

For further information please circle No. 51 on inserted "Quick Help" card and mail.

52
Wire Rope

A new 12-page pocket-sized booklet describing CenterFit wire rope, has been announced by Jones & Laughlin Steel Corporation, Pittsburgh 30, Pa. CenterFit is an exclusive J&L product. The booklet contains complete technical data. Included are summaries of various successful field applications of CenterFit on clamshells, shovels, draglines, bulldozers and scrapers, and industrial hoists.

For further information please circle No. 52 on inserted "Quick Help" card and mail.

53
Diesel Engines

Four new bulletins on its new 1-cylinder, 4½ in. x 5¼ in. diesel engine have been announced by Nordberg Mfg. Co., Milwaukee 7, Wis. These bulletins, Nos. 166, 167, 167-A and 168, give specifications, detailed information and outline drawings of Nordberg Model 4FS-1 diesel engines as adapted to power take-off with and without clutch (167 and 167-A), generating units (166) and pumping units (168). These 4-cycle, one-cylinder Nordberg diesel engines are rated at 15 h.p. at 1800 r.p.m. and 10 h.p. at 1200 r.p.m.

For further information please circle No. 53 on inserted "Quick Help" card and mail.

54
Maintainer

A new 16-page bulletin announced by Huber Manufacturing Co., Greenwood St., Marion, O., explains how the Huber Maintainer's several front-end attachments can be used for a wide variety of construction and maintenance applications. The 42½ h.p., 6,000 lb. "All-Purpose" Huber can be operated as a grader, berm leveler, road planer, bulldozer, lift-loader, snow plow, highway mower, one-way broom, and patch roller.

For further information please circle No. 54 on inserted "Quick Help" card and mail.

55
Clamshell Buckets

The Haiss rehandling type power wheel clamshell buckets are illustrated and described in an 8-page bulletin of George Haiss Mfg. Co., Inc., 141st on Park

Quick Help on Product Information

1. For latest information on any product you need in road-building, earth moving, heavy construction, etc., check items on this page, fill out coupon, clip page, and mail. If convenient, use typewriter or print. Or attach to your business letterhead. Give *particular type, model, capacity, or other specific data* on the blank line below. The blank line can also be used for naming items not listed. Address ROADS AND STREETS, Reader Service Department, 22 West Maple Street, Chicago 10, Illinois.

2. If you prefer, instead of mailing coupon, use business-reply card inserted in this publication. Just fill in our code numbers on blank lines, tear out, and mail.

3. See also other uses of cards for obtaining data on any products or literature advertised in this issue of Roads and Streets.

4. Cards are also usable for further information on any items described in the "New Equipment and Materials" or "Manufacturers' Literature" sections—see back part of magazine.

Check products below on which you wish us to obtain information for you:

I AGGREGATE:
- ☐ 1 Bins and Hoppers
- ☐ 2 Conveyors
- ☐ 3 Crushers
- ☐ 4 Portable Plants
- ☐ 5 Screens

II BITUMINOUS:
- ☐ 6 Batchers
- ☐ 7 Finishers
- ☐ 8 Distributors
- ☐ 9 Dryers
- ☐ 10 Heaters
- ☐ 11 Plants (central)
- ☐ 12 Plants (travel)

III CONCRETE:
- ☐ 13 Batchers
- ☐ 14 Buggies and Carts
- ☐ 15 Finishers
- ☐ 16 Joints, Exp. and Contr.
- ☐ 17 Mixers (under 1 yd.)
- ☐ 18 Mixers (1 yd. up)
- ☐ 19 Pavers
- ☐ 20 Reinforcing Steel
- ☐ 21 Road Forms (1000' set)
- ☐ 22 Tower
- ☐ 23 Truck Mixers

IV CRANES:
- ☐ 24 Crawler Mounted
- ☐ 25 Truck Mounted
- ☐ 26 Piledrivers

V GRADERS:
- ☐ 27 Blade, self propelled
- ☐ 28 Blade, pull type
- ☐ 29 Blade, under truck
- ☐ 30 Elevating

VI LOADERS AND TRENCHERS:
- ☐ 31 Front-end loader (tractor mounted)
- ☐ 32 Loader, bucket type and belt type
- ☐ 33 Trencher or Ditcher

VII HAULING EQUIPMENT:
- ☐ 34 Dump Truck
- ☐ 35 Other Trucks
- ☐ 36 Dump Wagons, tractor drawn
- ☐ 37 Flatbed Trailers

VIII PUMPS:
- ☐ 38 Centrifugal
- ☐ 39 Diaphragm
- ☐ 40 Piston

IX POWER UNIT:
(Independent)
- ☐ 41 Gasoline
- ☐ 42 Diesel
- ☐ 43 Electric

X ROLLERS:
- ☐ 44 Power (Smooth)
- ☐ 45 Pneumatic Tire
- ☐ 46 Sheepsfoot

XI TRACTORS:
- ☐ 47 Crawler
- ☐ 48 Rubber Tired

XII TRACTOR EQUIPMENT:
- ☐ 49 Bulldozers
- ☐ 50 Power Control Units
- ☐ 51 Rippers
- ☐ 52 Scrapers, tractor drawn
- ☐ 53 Scrapers, self-powered

XIII BUCKETS:
- ☐ 54 Clamshell
- ☐ 55 Concrete
- ☐ 56 Dragline
- ☐ 57 Orange Peel

XIV SHOVELS AND DRAGLINE:
- ☐ 58 Crawler (under 1 yd.)
- ☐ 59 Crawler (1 yd. up)
- ☐ 60 Truck Mounted

XV ROCK DRILLS, AIR TOOLS:
- ☐ 61 Air Compressors
- ☐ 62 Backfill Tampers
- ☐ 63 Clay Diggers
- ☐ 64 Concrete Vibrators
- ☐ 65 Drills, cable tool
- ☐ 66 Drills, tripod and wagon
- ☐ 67 Drills, rock, hand-held
- ☐ 68 Paint Sprayers
- ☐ 69 Paving Breakers
- ☐ 70 Riveters and Chippers

XVI MISCELLANEOUS:
- ☐ 71 Buildings, portable
- ☐ 72 Earth Drills, power
- ☐ 73 Light Plants
- ☐ 74 Lubrication, Service
- ☐ 75 Mowers, Highway
- ☐ 76 Power Saws
- ☐ 77 Soil Stabilizing Equipment
- ☐ 78 Spreaders, sand
- ☐ 79 Street Flushers
- ☐ 80 Street Sweepers
- ☐ 81 Welders
- ☐ 82 Cutting Torches
- ☐ 83 Hydraulic Jacks
- ☐ 84 Hydraulic Control Equipment
- ☐ 85 Hand Tools
- ☐ 86 Hoists, derrick type
- ☐ 87 Highway Guard
- ☐ 88 Snowplows, rotary
- ☐ 89 Snowplows, v or wing
- ☐ 228 Salt

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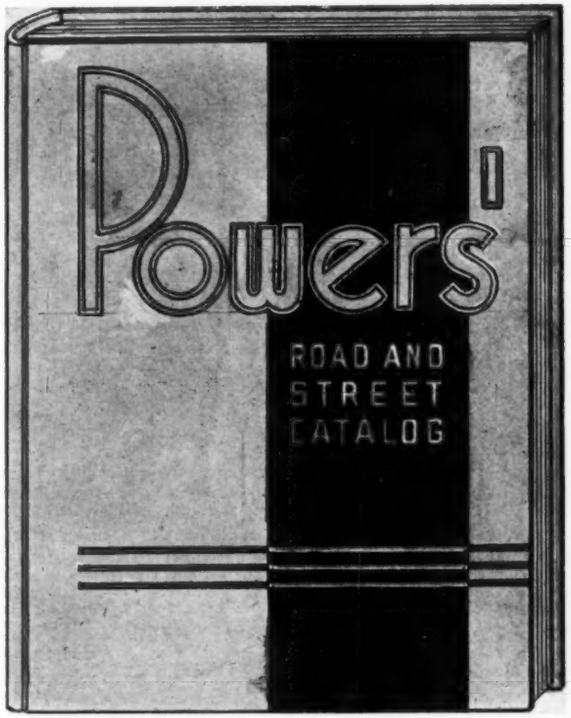
City Engineer, Mobile, Alabama

"Used for advising customers where to buy equipment we don't handle."
Equipment Distributor, Eau Claire, Wisconsin



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Equipment Specialist, Bur. of Public Roads, Washington, D.C.

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***Published by* GILLETTE PUBLISHING CO.**

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NEW YORK CLEVELAND LOS ANGELES SAN FRANCISCO

Ave., New York 51, N.Y. Illustrations of the buckets in various rehandling operations are given. Specifications of the several sizes from ½ cu. yd. to 3 cu. yd. are included in the bulletin.

For further information please circle No. 55 on inserted "Quick Help" card and mail.

WITH THE MANUFACTURERS & DISTRIBUTORS

Air Reduction Changes

J. A. Hill, president of Air Reduction Co., Inc., has announced the appointment of H. R. Salisbury as president of Air Reduction Sales Co., 60 E. 42nd St., New York, N. Y. Mr. Salisbury has been with the organization over 23 years in various executive capacities. Appointed vice presidents were H. F. Henriques (General Sales), J. J. Lincoln, Jr. (Railroad Sales and Sales Services), S. B. Stouffer (Distribution), N. L. Wisser (Field Office Management). Other officers of Air Reduction Sales Co. are: C. G. Andrew, vice president (Operating), J. D. Gunther (secretary), W. Winters (treasurer) and J. E. Slater (controller).

New Caterpillar Distributor

Crater Lake Machinery Co., Klamath Falls, Ore., has been appointed successor Reed Tractor and Equipment Co. as "Caterpillar" distributor in south central Oregon and portions of California. The new company will headquarter in Klamath Falls with a branch store at Medford. The territory to be served by Crater Lake Machinery Co. will comprise the counties of Crook, Deschutes, Lake, Klamath, Jackson, Josephine in the state of Oregon, and in California the County of Modoc and portion of Siskiyou and Lassen counties. Nelson Reed, former owner of Reed Tractor and Equipment Co. and "Caterpillar" distributor since December 31, 1935, is retiring.

Distributes English Cranes

The Jones line of bantam-weight cranes, manufactured in England by K & L Steelfounders & Engineers, Ltd., are now being distributed throughout a considerable area of the United States by Tractor & Equipment Co., 3515 West 51st St., Chicago, Ill., according to a recent contract entered into between the two companies. Cranes will be shipped from England without motor, boom, counterweight and many other component parts, all of which will be purchased in this country or fabricated by Tractor & Equipment Co. and installed by them in their Chicago plant. Tractor & Equipment Co. will appoint dealers in principal cities in the near future.

Opstad Promoted by 3M

Donald O. Opstad has been promoted to general sales manager for the "Scotchlite" division of the Minnesota Mining & Manufacturing Co., St. Paul, Minn. He joined the company in 1937 as a tape salesman, and was sales manager of traffic and safety products in the "Scotchlite" division prior to this promotion. Frederick P. Gunning succeeds Opstad as sales chief for "Scotchlite" safety lines. A member of the 3M organization since 1939. Gunning was eastern regional sales manager for reflective products before assuming his new duties.

Hercules Powder Appointments

Hercules Powder Co., Wilmington, Del., has created two new top posts at its Experiment Station in Wilmington. Dr. Peter VanWyck, formerly technical assistant in the Research Department, becomes assistant director of the Experiment Station responsible for the work done by the Cellulose Products, Explosives, and Virginia Cellulose research divisions. Dr. Richard S. George, formerly manager of the Naval Stores Research Division, will be assistant director of the Experiment Station responsible for the work done by the Naval Stores, Paper Makers Chemical, and Synthetics research divisions. Dr. Reginald W. Ivett succeeds Dr. George as manager of the Naval Stores Research Division. The company also announced the transfer of two men from the home office to the Experiment Station research staff. They are: Edmund Winterbottom, who is appointed administrative assistant to Dr. Schultz; and Dr. John T. Hays, appointed special assistant in the Scouting Research Division. Dr. Hays also will continue his university contacts with prospective technical employes.

Appointed General Sales Manager

L. F. Craig

Lucien F. Craig has been named general sales manager of special products for Gulf Oil Corporation. In his new post, created in the current reorganization of the firm's domestic sales program, Mr. Craig will direct sales of such products as asphalt, naphtha, stock oil, butane, propane and petroleum coke. Mr. Craig joined Gulf in 1935. In recent years he was advanced to assistant general manager of fuel oil sales. In addition to service with the company, Mr. Craig was assistant director of Supply and Transportation in the Petroleum Administration for War and active on other committees controlling petroleum supply during the last conflict.

New Distributor for Municipal Supply

Coast Equipment Co., 948 Bryant St., San Francisco 1, Cal., has been appointed exclusive Northern California sales and service representative for the Municipal Supply Company of South Bend, Ind., manufacturers of "South Bend" street maintenance equipment.

Sinclair Promoted by Goodyear

J. L. Sinclair

John L. Sinclair has been appointed Cleveland, O., district manager of the Mechanical Goods Division of the Goodyear Tire & Rubber Co., Akron, O.

He has been associated with the Mechanical Goods Division since 1924. He joined Goodyear at Chicago as a mechanical goods sales clerk in June, 1924 and was appointed branch operator at Milwaukee, Wis., in 1930. He was transferred to Atlanta, Ga., in 1932 and the Birmingham, Ala., in 1933.

Appointed Service Director

W. J. Corr

W. J. Corr has been appointed director of service for Mack Trucks, Inc., New York, N. Y. This is a newly created position. Combining former service engineering and general service departments under his command, Mr. Corr will oversee all parts and service activities for trucks, buses and fire apparatus in Mack's eight major selling divisions in the U. S. and Canada and its 67 direct factory branches. With Mack for a quarter of a century, Mr. Corr has served the company as service manager for its branches at Akron, Cincinnati and Chicago and for its Central Division, headquarters of which are in Chicago.

Kadz Joins Southwest

H. D. Kadz

Earl B. Maloon, manager of the construction equipment division of Southwest Welding & Manufacturing Co., Alhambra, Calif., has announced the appointment of Harry D. Kadz as assistant manager of that division. Mr. Kadz is widely known in the heavy construction industry in the West and in the logging industry in the Pacific Northwest. He was formerly general manager of Kay-Brunner Steel Products, Inc., with whom he was associated for a number of years.

Mandt Co. Incorporated

O. G. Mandt

The Mandt Manufacturing Co. has been incorporated at Columbus, O., to manufacture and market the Mandt Swing Loader, a hydraulically operated material loader with 180° swing which can also be quickly converted by attachments to either a mobile crane or backhoe. General and sales offices are at 490 W. Goodale St., Columbus, with a large plant at Warren, O., where machines are now in production. O. G. Mandt, who heads the new company, patented and marketed the first mobile swinging loader and crane in the country more than 27 years ago, prior to joining the Jaeger Machine Co., from which he recently retired as president. President Mandt states that national distribution, coast to coast, has already been established through leading construction equipment dealers who maintain complete stocks and service. Other officers of the company are V. G. Mandt, vice president in charge of sales, J. J. Quilligan, secretary-treasurer, and Charles Taylor, assistant secretary-treasurer.

Appointed General Manager

J. W. Cunningham

James N. Cunningham, heretofore district representative for Caterpillar Tractor Co., has been appointed general manager of Carolina Tractor & Equipment Co. Salisbury, N. C. He joined Caterpillar Tractor Co. in 1935, and later became district representative for the states of Maryland, Virginia and North Carolina, a position he held until his recent appointment.

New GM Engine Distributor

Colorado Builders Supply Co., Casper, Wyo., has been appointed distributor of General Motors Series 71 industrial and oil field diesel engines. Their territory covered from Casper includes all of Wyoming except Tipton, Lincoln and Uinta counties.

New Trojan Representative

Joe R. Hames has been appointed Southwestern representative for Contractors Machinery Co., Batavia, N. Y., manufacturer of Trojan road tools. Mr. Hames, a native born Texan, will make his home in Dallas. He has had a wide experience in the construction equipment field. During the war he served as Captain with the 84th Infantry Division in Germany. Prior to that he was with Fairbanks Morse and Co. and for the past four years has been a sales engineer selling to construction equipment distributors in the Southwest. In his new position, Mr. Hames will serve Trojan Distributors in the following states: Texas, Louisiana, Mississippi, W. Tennessee, Arkansas, Oklahoma, Arizona and New Mexico.

Baer Steel Products Company

A new company known as the Baer Steel Products Company has been formed in Auburn, Washington. This company will manufacture excavating buckets and teeth, involving the use of a new grade of steel. The manager of this firm is Joe Baer, formerly chief designing engineer of Electric Steel Foundry Co., Portland, Wash., and for eleven years previously with the Bucyrus-Erie Co. The new company will manufacture bucket cutting fronts and teeth using a new steel alloy announced by Pacific Car and Foundry Co., known as "Fibraloy."

Walker to Manage Mack Division

R. W. Walker

R. W. Walker, Mack-International Motor Truck Corporation vice president, has been named manager of the company's newly created Eastern Division, a territory representing the consolidation of three of the company's major east coast sales divisions. In his new post Mr. Walker will direct all Mack truck, bus and fire apparatus sales and service activities through the 17 direct factory branches maintained by the company throughout New York State and northern New Jersey.

Appointed District Sales Manager

E. R. Herb

Earl R. Herb has been appointed district sales manager for the Osgood Co. and The General Excavator Co., Marion, O., with headquarters at Milwaukee, Wis. He will cover the states of North and South Dakota, Minnesota, Wisconsin, Michigan and the northern halves of Indiana and Illinois. Prior to joining Osgood-General sales force, Mr. Herb spent more than 11 years in the heavy construction equipment field, eight of which were in the field calling upon contractors and allied industries.

New Lima Sales Representatives

The Lima Shovel and Crane Division, Lima-Hamilton Corporation, Lima, O., has appointed six new sales representatives for its line of power shovels, cranes and draglines. The Flack Equipment Co., P. O. Box 1526, Toledo, 4, O., will cover the Toledo sales area; John C. Louis Co., Incorporated, 511 West Platt St., Baltimore, Md., will cover the District of Columbia, State of Maryland, State of Delaware with the exception of New Castle County, and the Counties of Arlington, Fairfax, and Loudoun in the State of Virginia. The Buran Equipment Co., 777 100th Ave., Oakland, Calif., will cover the territory for Northern California; Metalweld, Incorporated, 26th and Hunting Park Ave., Philadelphia 29, Penn., will cover the Philadelphia sales area; Scott Machinery Co., 84 South Main St., Concord, N. H., will cover the State of New Hampshire; and Stockberger-Seastrom, Incorporated, 2200 North Mannheim Rd., Melrose Park, Ill., will cover the City of Chicago area.

Arroyo Made Sales Manager

James M. Arroyo has been appointed sales manager for Martin Machinery Co., Kewanee, Ill., manufacturers of heavy duty Gooseneck trailers. Mr. Arroyo became associated with the Martin sales department several months ago to head export sales. For the past 15 years he has been connected with domestic and export sales supervisory work.

Britton Joins Schield-Bantam

The Schield-Bantam Co., Waverly, Iowa has announced the appointment of G. O. Britton as their sales manager. Mr. Britton comes to the Schield Co. from Athey Products Corporation where he also served as sales manager. The Schield-Bantam Co. are manufacturers of a 1/3 yard, truck-mounted power shovel with interchangeable booms and buckets which permits the unit to be quickly converted into a dragline, trench hoe, clamshell, magnet crane, crane or pile driver.

Corr-Plate Piling

Corr-Plate piling is now being manufactured by Caine Corr-Plate Piling Co., 2535 South State St., Chicago 16, Ill. All correspondence relative to the piling should be addressed to the new organization. A stock of standard sizes will be carried for one to two day delivery. This organization consists of Irvin W. Caine, Harmon L. Caine and Arthur B. Mayer.

New Riddell Distributor

Stockberger-Seastrom, Inc., Indianapolis, Ind., and Fort Wayne, Ind., have been appointed distributors by W. A. Riddell Corp., Bucyrus, O., for Warco motor graders and Hercules road rollers in the state of Indiana, except in the extreme northwestern counties.

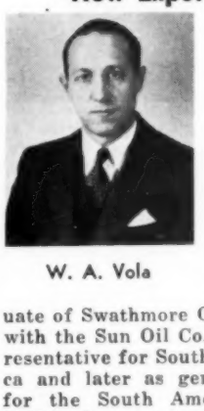
New Davey Distributors

Davey Compressor Co., Kent, O., has announced three new dealership appointments. They are: Frost Machinery Co., Ltd., Winnipeg, Canada; Hennessey-Forrestal Machinery Co., St. Louis, and Rosholt Equipment Co., Minneapolis.

New Stow Distributor

The Construction & Equipment Division of the Syracuse Supply Co. has been appointed distributor for the Stow Manufacturing Co., 445 State St., Binghamton, N. Y., in the Central New York area for its complete line of concrete vibrators, vimrator accessories, and screeds.

New Export Manager



W. A. Vola

Walter A. Vola has been appointed export manager for The White Motor Co., Cleveland, O. He succeeds R. L. Boughton who has retired. Mr. Vola has had an intensive experience in foreign trade in both South America and Europe. He is a graduate of Swathmore College. He has been with the Sun Oil Co. first as special representative for South and Central America and later as general sales manager for the South American Division. In 1946 he became export manager of Graflex, Inc., of Rochester, N. Y. He served that position until his recent appointment as export manager of The White Motor Co.

New Joy Representative

Robert L. Frazer has been appointed representative in Spokane, Wash., for the Joy Manufacturing Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa. His headquarters will be at 1118 Ide Ave., Spokane. A 1942 mining engineer graduate of the Montana School of Mines, Mr. Frazer has been an engineer with U. P. Coal Co. in Rock Springs, Wyo.; Potash Co. of America in Carlsbad, N. Mex., and the Freeport Sulphur Co. in Freeport, Tex., successively.

New Huber Distributor

Carswell Truck and Tractor Co., Inc., 675 Glen St., Glen Falls, N. Y., has been appointed distributor for the Northeastern section of New York state for Huber Manufacturing Co., Marion, O.

Bauer Industrial Sales, Inc., 749 Lincoln Road, Worthington, O., has been appointed distributor for Huber Manufacturing Co., Marion O., for a territory in central Ohio, covering the counties of Franklin, Pickaway, Madison, Fayette, Delaware, Union, Champaign and Logan.

Slag Bulletin Compiled by Mines Bureau and Industry

Iron blast-furnace slag, once considered a waste product of the iron and steel industry, has been developed into a useful raw material and now is widely used in road construction, for railroad ballast, as aggregate in concrete, and for other purposes, according to a Bureau of Mines book released today for sale through the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C.

The first comprehensive summary of information published in the English language of the production, processing, and uses of iron blast-furnace slag, the book was published by the Bureau in cooperation with the National Slag Association of Washington, D. C., which supplied technical data and other information, according to Bureau Director James Boyd.

During 1947, when 32,284,000 tons of slag were produced as a byproduct, 19,582,000 tons or 61% valued at nearly $19,526,000 was used commercially, the major tonnages going into highway construction and railroad ballast. Of the total in 1947, 27% was used in roads and streets other than in concrete and bituminous work, 22% in bituminous construction, and railroads used 21%. About 9% was used in concrete block and other concrete products, 8% in portland-cement-concrete construction, 5% in cement manufacture, 2% roofing materials, and 6% for other purposes.

In the United States, a total of 62 plants for processing iron blast-furnace slag produce four general types of commercial slag: screened air-cooled, used chiefly as aggregate and for railroad ballast; unscreened air-cooled, employed principally in base courses for roads and as a fill material; granulated slag, for filling purposes, in highway pavement base courses, and in the manufacture of cement; and lightweight slag, used in molded concrete products.

The development of the slag industry, as well as production and processing, are described in detail in the Bureau bulletin, which also discusses chemical and mineralogical composition, physical properties, and specific uses. More than 100 illustrations and a comprehensive bibliography containing 550 references. The report was prepared by G. W. Josephson, chief of the Nonmetal Economics Branch; F. Sillers, Jr., senior metallurgist; and D. G. Runner, commodity specialist, all of the Washington, D. C., staff of the Bureau of Mines, with the assistance of the Problems Committee of the National Slag Association.

Copies of Bulletin 479, "Iron Blast-Furnace Slag: Production, Processing,

Properties, and Uses," may be obtained only from the Superintendent of Documents, Government Printing Office, Washington 25, D.C., for 75 cents each (paper covers). Not sold or distributed by the Bureau of Mines. Single copies in special covers available (while supply lasts) from National Slag Association, 644 Warner Bldg., Washington 4, D.C.

Booklets, Pamphlets and Reports Received

"Highway Needs of Kansas," a report of the Kansas Fact Finding and Research Committee, authorized by the Kansas State Legislature in 1947. This engineering analysis is one of several such highly illustrated and detailed state reports made under the direction of G. Donald Kennedy, Consultant from the Automotive Safety Foundation.

"Major Thoroughfares" is the title of a preliminary report by the Toledo Lucas County Plan Commissions. Toledo, Ohio. An 18-page analysis of traffic conditions in the Toledo metropolitan area and ultimate plans for traffic relief.

"1949-50 Inventory and Guide for Action." This impressively printed 76-page handbook has been prepared based on the President's Highway Safety Conference meeting held in June, 1949, in Washington. A handbook of working methods and suggestions, it contains chapters on laws and ordinances, accident records, education, enforcement, engineering, and other phases. Available at 50c from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

A 230-page profusely illustrated bulletin covering all phases of interest in highway development, administration, financing, planning, design, construction, and maintenance, has been published by the U. S. Public Roads Administration, and is now on sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for 45 cents per copy. The bulletin was prepared by staff members of the Public Roads Administration, each an authority in his special field, for the use of foreign engineers visiting the United States to observe highway practice in this country; but it also will be a useful reference work for all students, engineers, and administrative officials interested in highway work.

Over 4000 current college and university research projects in engineering subjects, representing expenditures of over $35,000,000, are listed by title in the 1949 "Review of Current Research," published last month by the Engineering College Research Council of the American Society for Engineering Education. Entries in the book are from 82 educational institutions. Use of the volume is facilitated by a breakdown of research projects according to the engineering departments involved, and by a complete index to research project subjects.

Copies of the book, paper bound and including more than 180 pages, are available ($1.75 postpaid) from the Engineering College Research Council. Address orders to F. M. Dawson, Chairman, in care of the College of Engineering, State University of Iowa, Iowa City, Iowa.

"Highway Research Review" — a new quarterly multigraphed publication series bearing this title is announced by the Highway Research Board. First issue, series one, number one, is off the press, and is available at 45c per copy, as will be subsequent numbers. The review provides subscribers to the Research Correlation Service with a classified listing of Highway Research projects in progress or recently reported on by state highway departments, federal bureaus, universities, colleges and other agencies.

Heavy Equipment
Immediate Delivery

2¾ yd. P&H Crane, shovel front and boom.
1½ yd. P&H Crane.
¾ yd. P&H Crane.
¾ yd. BAY CITY Crane.
¾ BUCYRUS-ERIE Crane.
½ yd. INSLEY Crane.
4/10 yd. "QUICK-WAY" Crane, truck mounted.
D7 "CATERPILLAR" with CARDWELL Crane.
D8 "CATERPILLAR" with front end cable dozer.
D6 "CATERPILLAR" Bare.
D4, "CATERPILLAR" with cable dozer.
R4 "CATERPILLAR" with cable dozer.
4-B.B.S. 9/12 yd. WOOLDRIDGE Scrapers (New).
200 h.p. ATLAS IMPERIAL DIESEL.

All kinds of CONSTRUCTION EQUIPMENT

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ALEUTCO Corp.
P.O. Box 98 Phone 5-3447
Boeing Renton Plant
RENTON, WASH.

FOR SALE

3—TOURNAPULL Super C with Scrapers and Rock Wagon. Has all new tires on all 3 units. Excellent condition. Bought new in 1946. $25,000 takes all 3 units. Must be seen to appreciate.

Contact Tom Ballard or John Hamilton
Phone 3926
Bardstown, Kentucky
If Interested

Winch Trucks, Construction Trucks With Utility Bodies

We have 20 Fords and Brockways with transmission winches and derricks that were are suitable for Electrical Contractors, Tree formerly used by the Telephone Co. They are in extra good mechanical condition and Work or many other lines of Construction.

Prices range from $400.00-$750.00

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1—LS 85 LINK BELT SPEEDER ¾ YD.
HEAVY DUTY—USED 3 SEASONS
VERY GOOD CONDITION
REASONABLE

RUFFRIDGE-JOHNSON EQUIPMENT CO., INC.
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SPACE HEATERS
War Surplus Bargain

New—Ready To Use!
40,000 BTU capacity

—Burning gasoline, kerosene or diesel fuel.
—Electric blower—12 V. DC or 110 V. AC using small transformer.

Portable, Quick, Clean Heat

Ideal for curing room, concrete plants, work under construction, emergency heat, or auxiliary heaters.

$95.00 each

Clapp, Riley and Hall Co.
14 No. Clinton St.,
Chicago 7, Illinois

For Sale or Trade

1—Barber Green crawler type stock-pile loader A-1 condition, will trade for Barber Green or some other make ditching machine.

E-Z LOAD, SERIAL NO. 1418

1—15 yard Daniels, cable operated Scraper, 4 wheel 18x24 tires, push block on rear, condition of scraper and rubber like new. Will trade for smaller cable operated scraper, or Caterpillar D7 with bulldozer.

1—New 2 yard Williams Clam-Shell bucket. Will trade for smaller clam-shell bucket, or D-4 Caterpillar Diesel tractor, we paying the difference.

Many other items to offer in Contractors Equipment

WE BUY, SELL, OR TRADE

What do you have to offer—crawler tractors with dozers, large combination draglines & Shovels, Asphalt plants, asphalt distributors, steam pile driver. Give full description, condition, model No., serial No. in first letter.

BROWN & MALONE
1410 EAST 9th ST. P. O. BOX 305
LITTLE ROCK, ARKANSAS

Miniature DUST MASK

Keeps dust out of nose. Handy as pair of glasses. 9 sq. in. filter. Weighs only 1 oz. Order Today!

Only $1.00 p.p.

Jerry Bryant Products—Dept. R
919 N. Michigan Ave., Chicago 11, Ill.

FOR SALE

One Caterpillar D7 Tractor with Model 70 Caterpillar Scraper and Caterpillar Control Unit.

SWEENEY BROS. TRACTOR CO.
1622 Front St.
Fargo, North Dakota

FOR SALE

1—B & W coal pulverizer
1—Jeffrey hammer mill 24" x 30"
1—American pulverizer with 125 HP motor
1—70 HP Marine type diesel engine
All steel dredge boats and tug boats
Electric motors AC
1—10' x 150' kiln with new liners
Fuller clinker cooling equipment for 10' kiln
Schmidth tube mill 6'6" x 20'

OLLIE E. LAWRENCE
P. O. BOX 688
QUINCY, MICHIGAN

FOR SALE

1—General 105, ½ yd. crane and backhoe.
1—Lorain 45, ¾ yd. crane and backhoe.
2—Gardner-Denver 105 air compressors.
1—LeRoi 105 air compressor.
1—Case tractor with Hough front end loader.
Generators, pumps, welders, saws, trucks, miscellaneous small equipment.

Hanagan Brothers, Inc.
Box 28 Phone 3222
URBANA, OHIO

FOR SALE

8-12 Ton Humbe Road Roller. Used very little. Perfect.....$2,500.00

THE JENKINS COMPANY
THOMASVILLE, GEORGIA

FOR SALE

4—12,000 gallon, 8' diameter x 32' long, ¼" plate, welded steel storage tanks. Price, $500.00 each f.o.b. cars Franklinton, Louisiana.

ROGERS AND WRIGHT, INC.
710 Peoples Building
CHARLESTON, WEST VIRGINIA
(Phone 30-171)

FOR SALE

Buckeye C-15 lateral type trencher in excellent condition.
P. & H. lateral type trencher in fair running condition. Price $1,800.00.
Cleveland Model 110 manufactured 1947. Price $6,300.00.
Buckeye Model 410 manufactured 1946. Price $6,800.00.
Parsons Model 310 lateral type Diesel motor. Price $12,500.00.
Austin Model 105. Price $2,200.00.
Parsons Model 21. Price $2,800.00.
Buckeye ¾-yd. Shovel manufactured 1947. Excellent condition. Price $8,500.00.
Osgood Model 200 Shovel, serial No. 3175. Price $4,000.00.
Osgood Model 200 crane with 39" magnet complete. Price $8,200.00.
3-wheel, 10-ton Diesel Huber roller. Like new. Used 400 hours. Price $4,800.00.
Garwood scraper, Model 515, 16 yds. Price $3,200.00.
Bucyrus-Erie, Model 152, 16 yds. Good condition. Price $3,000.00.
Bucyrus-Erie, Model S-67, 8 yds. A-1 condition. Price $2,500.00.

AIR COMPRESSOR RENTAL CO.
19615 Nottingham Road, Cleveland 10, Ohio
KENMORE 8000

FOR SALE

1—Int. TD18, with Isaacson hyd. angledozer and with double PCU. 1948 model, one year old, A-1 shape.
1—LaPlant-Choate 6-8 yd. scraper, 1948 model.
1—¾ yd. Unit, Model 1020, 40 ft. boom and fairlead.
1—½ yd. Unit trenchoe attachment; can be used on ½ yd. or ¾ yd. machine.
1—Lima Model 34, ¾ yd. crane, 50 ft. boom, fairlead, with ¾ yd. trenchoe. Less than 1 year old. Like new.
1—1948 F8 Ford 5 yd. dump truck—10,000 miles.
1—1948 F7 Ford 5 yd. dump truck—11,000 miles.
1—1948 F6 Ford 5 yd. dump truck—7,000 miles.
1—1948 F6 Ford 4 yd. dump truck—7,000 miles.
1—1948 F2 Ford ¾ yd. pickup, A-1 shape.
1—1947 5 yd. dump truck—13,000 miles.
1—1942 Ford Tandem, 6-7 yd. truck.
1—1942 Ford tractor with winch and 5th wheel.
1—¾ yd. Owen clam bucket.
1—½ yd. Williams clam bucket.
1—¾ yd. Page dragline bucket.

Write or call:

HAROLD M. TOMPKINS EXCAVATING CO.
3111 Calumet Ave., Manitowoc, Wis. Phone 7162

USED EQUIPMENT BARGAINS

1—P and H, ¾ c.y. dragline crane, less bucket. Completely rebuilt $6,500.00

1—Gardner-Denver Model 99 wagon drill. Rebuilt $950.00

1—Knickerbocker 10S mixer, 2 pneumatic tires, automatic water system. Rebuilt $750.00

1—"Quick-Way" Model "J" ¼ cu. yd. crane (demonstrator). Completely mounted on GMC 2½-ton 4x6 truck $6,000.00

1—Scoot-Crete loader (new). Ideal for 11S or 16S concrete mixer. List $1,850 ..... $1,650.00

CASEY and EMMERT, Inc.
Construction Equipment
1424 West Ohio St. Phone HAymarket 1-6464 Chicago 22, Ill.

Manitowoc 1¼-1½ yd. 2000-B diesel shovel dragl.-crane, 1946, A-1, (Idaho).
Shovels—Draglines—Cranes, ⅜ to 10-yd.
Buckeye trenchers, 120, 160, 201, 203, 224.
Parsons trenchers, 25, 31, 250, 310.
Locomotives, diesel, gas, stm., 7-35 tons.
Steam cranes, Bucyrus 42B, 50B, on cats.
New GM diesel 300 HP twin power units, $3900.
B-Erie shovel front, 2¼-yd., 52B-55B.
H. Y. Smith Co., 828 N. B'way, Milw. 2, Wis.

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18M 12 x 12 fir timbers. In excellent condition ranging from 8' to 24'.
8M new #1 grade paving brick. All stored at Jeffersonville, Indiana.

HANAGAN BROTHERS, INC.
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"Caterpillar" D6 Tractor No. 9U-1135 equipped with Trackson T6 Traxcavator, excellent condition, guaranteed ..... $ 9,500

"Caterpillar" 35 Gasoline Tractor No. 5C486, good condition, needs new tracks ..... $ 900

"Caterpillar" D7 Tractor No. 4T-6693 equipped with LeTourneau Bulldozer, completely rebuilt, guaranteed $10,000

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45 ton Whitcomb diesel-elec. loco.
24" x 30' conveyor—portable
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Michigan Truck Crane, 12 ton
2 yd. Hayward orange peel bucket

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LET THIS OSGOOD 805 "MOBILE-CRANE" DO YOUR LIFTING JOB

It's the one man outfit that saves you dollars on any erection or utility job . . . it's rubber tired, 18 wheeled, one engine operated with independent motions of hoist, swing and travel boom . . . what more do you want?

It's safe lifting capacity ranges from 80,000 pounds on a 12 foot radius to 8,200 pounds at 60 feet.

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This machine has been slightly used and is a bargain at $30,000. Immediate delivery from our yard.

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Scraper, 9-12 yd. Le Tourneau, Model "U9," Cable Controlled, 1400 x 20 Tires, Fair Condition $850.00
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1—Used Caterpillar RD7 with LeTourneau DDPCU.
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CRAWLER TRACTORS and DOZERS

We have several good used Caterpillar and Allis-Chalmers with dozers or scrapers. This is not War Surplus but good sound equipment that has been traded in on new A-C tractors.

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Large Enough to Serve You.
Small Enough to Know You.

BARGAIN—FOR SALE

1—Used Byers ⅝ cu. yd. combination shovel, crane, trench hoe. Serial No. 60-5BB. This machine is powered with a 1949 4 cyl. International Gasoline Engine, Model U-9, Serial No. 16785, developing 55 h.p. at 1500 rpm.

The machine is being rebuilt in our shop and is equipped with all new crawler shoes. Trench Hoe has 25 ft. boom with ½ yd. bucket. Crane Boom 35 ft. in two sections, lattice type. Shovel attachment 18 ft. boom, 12 ft. dipper.

This machine in guaranteed good mechanical operating condition, cleaned and painted.

Offer Subject to Prior Sale.

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SPECIAL OFFER

Osgood Model 200 Dragline Hoe
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General Dragline 30' Boom
Northwest Model 3 Shovel Dragline

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FOR SALE

Used Barber-Greene Asphalt Plant—Volume Control

20 Ton Per Hour

Barber-Greene Mixer—Serial No. 840-4-1
Barber-Greene Dryer—Serial No. 830-3-1
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Chicago Heights Coal Company
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Telephone: Chicago Heights, Ill., 90

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1—R D 7 Caterpillar Tractor with Le Tourneau blade and double drum unit. Serial No. 9G3428.

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40' lattice mast, 80' lattice boom, with two 40 h.p. motors with controls complete, price $3,500.00.

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TRACTOR Model 15 Caterpillar in very good condition, located Springfield office.

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TRACTOR Caterpillar Model D4 44" ga. with hydraulic dozer. Reconditioned. Located in Boston.

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10,000 GPH, 2" Suction & Discharge. Model KH-2, driven by single cylinder air cooled engine; Steel Skid Mounted. Export boxed with 2" gate valve, 19 ft of 2" Suction Hose, 192 ft. of 2" Fire Hose with Brass Couplings on each length. Shipping Wt. 600 lbs.
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2—40" Telsmith Gyratory Crushers
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1—#6 Champion Jaw Crusher
1—8" x 6" Goulds Centrifugal Pump
2—6" x 5" Goulds Centrifugal Pumps
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1—⅜ yd. P & H Shovel
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Complete, new or rebuilt for International Harvester Tractors Model TD-9

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Price $2,800

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Equipment in Our Yard for Your Inspection.

1948—Insley Dragline Crane, Long Cats, 24" Pads, 35' Boom, Guaranteed—$7,750.00.
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1943—Osgood Crane, ½ Yard Back Hoe—$5,500.00.
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Complete Diesel Dozer & Wagon at a Price of a New Wagon, RD-7 Caterpillar with Cable Dozer, Double Winch and S-90 B.E. Ten Yard Wagon, Two Years Old, Like New, Only—$6,000.00.
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We also have used Trucks, Carryall Trailers, Small Dozers and Buckets.

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1—4' x 10' Pioneer scalping screen.

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1—G.D. 115 cu ft stationary compressor powered by 25 HP G.E. Elec. motor, new, 1948.

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802 Lima 2 yd dragline.

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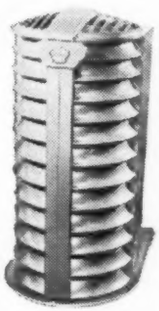

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28—T-9 International Crawler Tractors with Traction Swing Boom, $1,250 each.

7—Austin Badger ⅜ yard Cranes crawler mounted, $1,250 each.

15—Allis-Chalmers Crawlers, H-D-7, H-D-10, H-D-14 with dozers on P-C-U. All these are running low hrs., $4000 each. Also have International and Caterpillars, 50 Rollers 5, 8 and 10 ton Diesel or gas.

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5 yard to 15 yard

6—Quickway truck cranes, mounted on 6 x 6 trucks, $4,800 each.

Unit mobile cranes—Two 802 Koehrings, 304 Koehring Barge Mount also on crawlers. Good buys on Osgood unit Bay City Northwest Byers, Buckeye Insleys—Hansen Link Belt pan, Michigan Two 80-D Northwest—also Lorain. Parson Barber-Greene trenching machines. Ten 10 x 16 Jaw Crushers with motor mounted on steel wheels, unused, $1,100 each.

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#5—No. 66 Caterpillar Grader (pull type) with 12' blade, hand operated, leaning wheels, and a very valuable machine in ditching and grading where it is wet or soft $600

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#7—Heavy Duty Osgood Combination Crane & Shovel Equipped with 45' boom, 1 yd. Blaw Knox bucket; also equipped with shovel front and dipper stick. Has new 90 H.P. GM. Diesel Motor $8,000

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#11—Three Bag Ransome Mixer on four pneumatic tires. With scales and batch meter and Three pneumatic Tired Concrete Carts $1,200

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Bucyrus-Erie 54-B, Shovel Dragline

New Caterpillar D7, Caterpillar 70 scraper $14,500

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One Used 187 KVA, 164 R.P.M., 240 Volt, 3 Phase, 60 Cycle Chuse Engine and Generator Set in First Class Condition. For further information contact:

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Attention: D.F.K.

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2—3 ton LITTLEFORD model #155 Sidewalk Tandem Roller, on pneumatic tires. A 1.....$ 800.00
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Clamshell buckets various sizes from ¾ cu. yd. up.

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1—LIMA 601—1½ yd. combination clamshell, dragline 65′ boom. Caterpillar D13000 power unit 36″ treads, 4 yrs. old, very good condition.

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1—Bucyrus Erie GA-2, 1¼ yard shovels, good condition at bargain price. Each.....$4,000.00
1—Marion type 450 Steam, 1¼ yard shovel, good condition.....$1,200.00
1—Bay City, ½ yard, Model K-2, good condition.....$3,000.00
1—General ½ yard shovel, good condition.....$3,500.00

Eastern Clay Products, Inc., Jackson, Ohio

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1—BUCYRUS-ERIE, Model 10B, Combination Shovel, Crane and Clamshell, Powered with a Buda Gasoline Engine. Excellent condition and ready to go to work.

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54th & Lancaster Ave., Phila. 31, Pa.

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1—Federal 1948 Dumper, Model 29, 5 yard Body, Tires 100x20.
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1946 Marlow 4-inch Water Pump, Model WBT 210.
1—Emsco 9 yard Scraper.
1—Marion 2 cubic yards Shovel. Front Attachment for Model 352 or 360.

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10 WINCH TRUCKS

MACKS—G. M. C.—DIAMOND T
30,000 Lb. Winches mounted on 6-wheel.
Trucks A-1 mechanical condition.
Also 1¼-yd. Bucyrus-Erie Shovel Front

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9—New surplus Cleveland 102-A rotary air drills — Ea. $50.
1—Ross 19-HT fork lift 3-ton cap. — $3250.
1—Link-BELT indust. crane, solids, 6-ton cap., 12′-20′ boom — $2950.
1—TRACKSON swing crane on IHC T-9 — $4500.

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80-D Northwest 2½ cu. yd. diesel crawler shovel rebuilt and guaranteed.

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HODGE & HAMMOND, INC.
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1—Rebuilt 20′ Schramm Air Compressor mounted on 2 pneumatic tired trailer
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1—HBL BUDA Earth Drill, Slightly Used
1—New #25 Aeroil Concrete Heater—open flame type complete
1—Baughman Truck Body, self conveying unloading
4—Used Herman Nelson Heaters
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1—Used Mixermobile—Good Working Order, Portable concrete and elevating plant
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TD-18 International with Hydraulic Dozer, excellent condition.....$5,000.00
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RD-6 Caterpillar with Hydraulic Dozer, excellent condition.....$3,000.00
D-6 Caterpillar with Cable Dozer.....$3,500.00
HD-7 Allis-Chalmers with Garwood No. 26 Scoop.....$2,250.00
2 HD-7 Allis-Chalmers with Baker Hydraulic Dozers, both for.....$5,000.00
1 HD-5 Allis-Chalmers with Baker Dozer. 926 hrs.....$4,500.00

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Bargain $4,000

1 RD7 Caterpillar tractor with double drum LeTourneau power units and bulldozer. This machine has new idlers, sprockets, rollers and rails which are two months old. Starting motor diesel motor, final drive and power unit completely overhauled in March, 1949. In very good condition.

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Phones: HUmboldt 1642,
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Jaw Crushers—7x9 A/C Dodge Unused. 9x15 Champion. 14x26 Aeme.
3′x3′ Harding Ball Mill, like new.
Marlow Portable Gasoline Driver, 4″ pump—Capacity 500 gpm.
Dryers, 54″x30′. 2 Ruggles Coles Indirect Dryers. 8′6″x85′.
Speed Reducers, crushing rolls.
Lancaster horizontal pug mill, double shaft, chain drive. Tub 11′ long. 4′7″x3′. Good as new.

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DURHAM AVE. & L.V.R.R.
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Quantity — DESCRIPTION

1—Boss—10S Concrete Mixer on 4 Steel Wheels, pump and Batchmeter. Condition good, cleaned and painted. Radiator cooled engine.
1—Koehring—27E 2A Paver, powered with Waukesha gasoline engine, completely reconditioned, cleaned and painted. Ready to go to work. Serial No. 16441-2A.
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1—Huber Maintainer, complete with dozer attachment, new style hydraulic controls. Excellent condition.
1—Rex 3½S portable concrete mixer on pneumatic tired trailer powered with Hopper-cooled gasoline engine.
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901 So. 40 — Omaha, Nebraska
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Can Be Inspected in Our Yard at Omaha, Nebraska

PRICES SLASHED

1—Used 3½ S Wonder tilting mixers on pneumatic tires. $250.00
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2—New 11 cubic foot Dobson-McCord Concrete products mixers on skids; no power. Will sacrifice. $640.00 each
1—New Yale and Towne hydraulic lift truck, 3500 lb. capacity. Bargain, $450.00

All of the above equipment in excellent condition

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Steam Crane 1¼ yard. Thew rigged for pile driving
150 lb. boiler, 50 ft. boom. Good condition

JOHN D. SHEETZ CONST. CO.
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FOR SALE

TL 20 Loraine Crane on rubber, used less than one year, excellent condition, w/60′ boom, ½ yd. clam, ½ yd. back hoe, ½ yd. shovel.

THE WILLIAM P. BRAY CO.
365 Asylum Street — Bridgeport, Conn.

FOR SALE

5—D8 Caterpillar Tractors, 8R, w/dd pcu's and dozers..... $ 9,000.00 ea.
7—D8 Caterpillar Tractors, 2U series, w/dd pcu's and dozers ..... 11,500.00 ea.
7—Super "C" LeTourneau Tournapulls..... 7,000.00 ea.
8—DW10 Caterpillar units w/ Cat. 10 Scrapers and pcu's—Latest model, like new ..... 14,000.00 ea.
2—Model 12 Motor Patrols, large fronts..... 7,500.00 ea.
11—Model 9FDT—13 cu. yd. Euclid bottom dump units..... 6,000.00 ea.

All prices f.o.b. Cottage Grove, Oregon—Subject to Prior Sale

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Top flight salesman with experience and proven ability to sell heavy construction and earthmoving equipment to Contractor accounts for Dealer in midwest territory who has "Caterpillar" and other top line accounts.

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1948 HD10W Allis-Chalmers tractor with Gar Wood angle blade, Ser. 7912
1947 5-ton Reo Tractor and Fruehauf tandem axle lowboy
1944 8-ton Fruehauf bulldozer lowboy
8 ft. Rome brush land disc, all in good condition.

E. L. CHAFFEE
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New A-6 Flight Boots $9.00. Used Cleaned $5.00.
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Aero truck Low Boy Trailer Tires.
Cletrac Tractors $600.00

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500 Washington Avenue North
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FOR SALE

1—Quickway Shovel, Model J, mounted on a 4x4 Chevrolet army style truck.
1—Clark Airborne Cat and equipped with hydro dozer and starter.
1—Portable Crusher on rubber, 9x16 jaw, new screening plant; includes conveyor, new motors.
1—25 ft. x 18 in. Portable Conveyor on rubber.

Above machinery is in good shape.

Priced to Sell

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SALE RENT

GRIFFIN GENERATORS

WAUKESHA 6 cyl. Gas Engine
Electric Machinery Co.
Generator
17.5 KVA
AC—3 phase—60 cycl.—
220 Volt

Electric Starting
Complete Panel Board

GRIFFIN WELLPOINT CORP.
881 E. 141st St., New York 54

FOR SALE

Gardner-Denver air compressor, 315 C.F.M. Diesel, portable mounted on 4 pneumatic tires, Model WBG 315D, Serial #136705, "Caterpillar" D8800 engine.

Gardner-Denver air compressor, 315 C.F.M. Diesel, portable mounted on 4 pneumatic tires, Model WBG 315D, Serial #136704, "Caterpillar" D8800 engine.

Gardner-Denver air compressor, 315 Diesel, portable mounted on 4 pneumatic tires, Model WBG 315D, Serial #136036, "Caterpillar" Model D8800, engine Serial #656885.

1020 Unit crane w/3 cyl. GMC engine, Machine Serial #48567, Motor #37132256.

Byers 61W ½ yd. Traveler truck crane, gas engine driven on pneumatic tired wheels, complete w/electric starter, 30' boom w/tagline and fairlead, Serial 6160, w/new 12M Williams clamshell bucket w/digging teeth, Serial 10376.

Buckeye Model 160 ditcher complete, Serial #160-34, with Buda engine, equipment for 32" cut 16' depth.

Buckeye Model 120 ditcher, Serial #120-62 complete with Buda 6DT-317 Diesel power and trans. for 26" cut 11'6" depth.

All of the above equipment less than one year old.

WALSH OIL CO., INC.
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Phone 7422 **Joliet, Illinois**

FOR SALE

1¼-yard MARION COMBINATION GAS-ELECTRIC POWER SHOVEL Type 450, complete with 24'6" shovel boom, 16' dipper handle and dipper, and 60' dragline boom. This unit has been overhauled and is in excellent condition. Write for full details and price.

CRUSHERS

1—#6 Kennedy-Van-Saun gyratory crusher
#37 Kennedy-Van-Saun gyratory crusher
10" Traylor "Bulldog" gyratory crusher
2'4" Traylor, type TY, fine reduction crusher
3" Symons Cone crusher
9"x15" Farrell jaw crusher
9"x16" Cedar Rapids jaw crusher
8"x24" Rogers jaw crusher
9"x36" Cedar Rapids jaw crusher
15"x20" Universal jaw crusher
10"x24" Allis-Chalmers jaw crusher
24"x36" Traylor jaw crusher

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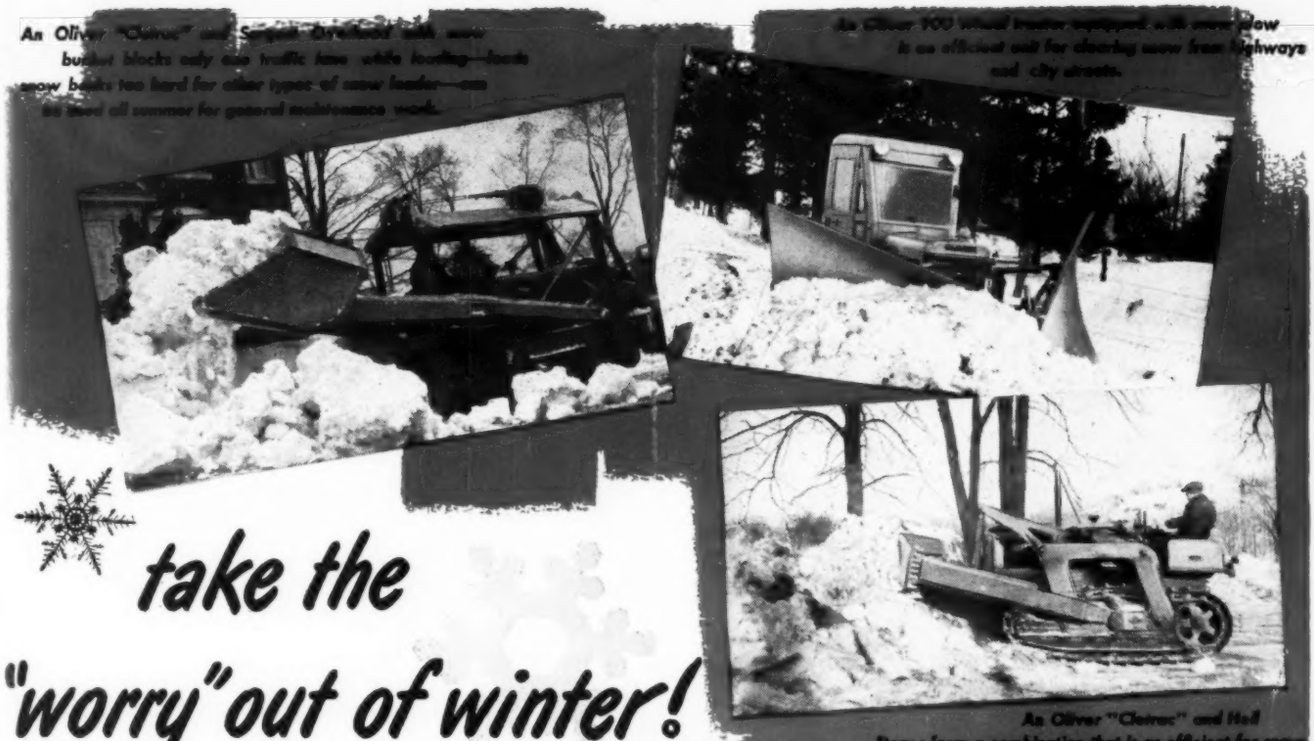


An Oliver "Cletrac" and Scraper Bucket with snow bucket blocks only one traffic lane while loading—loads snow banks too hard for other types of snow loader—can be used all summer for general maintenance work.

An Oliver 900 wheel tractor equipped with snow plow is an efficient unit for clearing snow from highways and city streets.

An Oliver "Cletrac" and Hoe Dozer form a combination that is as efficient for snow clearing as it is for dirt moving.

An Oliver "Cletrac" and front end loader gets high-piled snow off the street fast and economically.

For the task of clearing snow from sidewalks, driveways or side streets, an Oliver crawler tractor and Adjust-All snow plow is the answer.

take the "worry" out of winter!

Get the jump on winter with efficient Oliver snow removal equipment.

Both Oliver "Cletrac" crawler tractors and Oliver Industrial wheel tractors and their full line of allied equipment can help you keep highways, streets and sidewalks clear of snow . . . keep traffic moving despite the heaviest snowfall.

And, an important cost-cutting advantage to you is the fact that these husky tractors are year-round units . . . snow plows and snow loaders in winter, earth-movers, loaders, shovels, pavement breakers, mowers, ditch diggers, etc., in other seasons. Why pay for a lot of specialized individual construction and maintenance equipment when Oliver and Oliver "Cletrac" tractors can do the job at far less cost.

If you already own Oliver Tractors, ask your Oliver Distributor about snow removal equipment designed for your tractors. If not, you'll find it pays to investigate the Oliver line today.

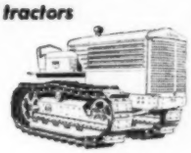
Cletrac

a product of

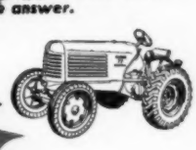
THE OLIVER CORPORATION

Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio

A complete line of crawler and industrial wheel tractors



OLIVER
Cletrac
SALES
SERVICE



"THE SIGN OF EXTRA SERVICE"

HIT IT HARD! *Marfak* won't splatter like ordinary grease—proof that heavy loads and rough roads won't hammer it out of spring shackles, tie rods and other chassis parts . . . proof that *Marfak* gives safer, longer-lasting protection with fewer applications.

This test "hammers home" the fact that...

Maintenance *Costs Less*

Because TEXACO MARFAK won't jolt or squeeze out of bearings... assures longer life for all chassis parts

HAMMERING jolts . . . heavy loads . . . road splash—you can protect your chassis bearings against all of them by using *Texaco Marfak.* It's the world's most famous chassis lubricant. *Texaco Marfak* guards bearings against dirt, rust and wear for extra hundreds of miles . . . assures longer life for chassis parts . . . reduces maintenance costs.

To give wheel bearings the same protection, use *Texaco Marfak Heavy Duty.* It seals itself in, assuring safer braking . . . seals out dirt and moisture . . . rust-proofs the bearing metal. No seasonal change is required.

Let a Texaco Lubrication Engineer help you simplify your lubrication procedures . . . get greater efficiency, lower maintenance costs. Just call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

ALREADY SOLD—*More than 300 Million Pounds of Texaco Marfak!*

BETTER PROTECTION FOR CRAWLER TRACK MECHANISMS

Lubricate with *Texaco Track Roll Lubricant.* It gives full, long-lasting protection . . . effectively seals out dirt and water . . . reduces wear. It's easy to apply . . . economical to use. *Texaco Track Roll Lubricant* assures lower maintenance costs . . . keeps your machines on the job.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

TEXACO STAR THEATRE presents MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA broadcasts every Saturday afternoon.

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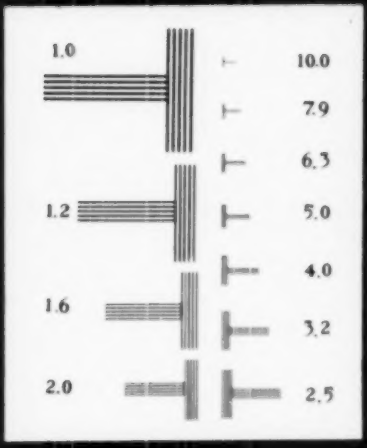
RESOLUTION CHART



100 MILLIMETERS

INSTRUCTIONS Resolution is expressed in terms of the lines per millimeter recorded by a particular film under specified conditions. Numerals in chart indicate the number of lines per millimeter in adjacent "T-shaped" groupings.

In microfilming, it is necessary to determine the reduction ratio and multiply the number of lines in the chart by this value to find the number of lines recorded by the film. As an aid in determining the reduction ratio, the line above is 100 millimeters in length. Measuring this line in the film image and dividing the length into 100 gives the reduction ratio. Example: the line is 20 mm. long in the film image, and $100/20 = 5$.

Examine "T-shaped" line groupings in the film with microscope, and note the number adjacent to finest lines recorded sharply and distinctly. Multiply this number by the reduction factor to obtain resolving power in lines per millimeter. Example: 7.9 group of lines is clearly recorded while lines in the 10.0 group are not distinctly separated. Reduction ratio is 5, and $7.9 \times 5 = 39.5$ lines per millimeter recorded satisfactorily. $10.0 \times 5 = 50$ lines per millimeter which are not recorded satisfactorily. Under the particular conditions, maximum resolution is between 39.5 and 50 lines per millimeter.

Resolution, as measured on the film, is a test of the entire photographic system, including lens, exposure, processing, and other factors. These rarely utilize maximum resolution of the film. Vibrations during exposure, lack of critical focus, and exposures yielding very dense negatives are to be avoided.